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BIOMEDICAL AND BEHAVIORAL SCIENCES

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19 MAY 1986

USSR REPORT  
LIFE SCIENCES  
BIOMEDICAL AND BEHAVIORAL SCIENCES

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## AGROTECHNOLOGY

### QUARANTINE SERVICE AND AGRICULTURAL RECONNAISSANCE

Minsk SELSKAYA GAZETA in Russian 7 Jul 85 p 3

[Article by V. Khachirashvili, Grodno: "'Spies' in Attractive Packaging"]

[Text] A golden ear of corn with a snake wrapped around it is the symbol of dependable protection of the harvest. This emblem is worn on a light-grey uniform by workers of the state plant-quarantine service in Grodno. These workers protect the border from the entry of weeds and dangerous pests, which can cause considerable damage to the country's agriculture. Their work is discussed in a report by the quarantine service post of the Grodno OKPP [Separate Border Control Post].

Tourist N. was returning from a trip abroad. He was well acquainted with the regulations concerning quarantine control, which is mandatory for anyone crossing the border. But the advertisement promised such fairy-tale harvests on the private plot that the unlucky tourist could not resist and carefully packed the packets of the vegetable seed underneath his clothing. Naturally this was not concealed from the eyes of experienced border guards and customs inspectors, and the workers of the quarantine service did not find it difficult to determine, with the help of special equipment, what kind of gift the "naturalist" was bringing in from abroad not only to his neighbors but to the entire agricultural region as well.

Common ragweed--here is a brief description. It is a very tenacious annual weed. It develops at the expense of cultivated plants. It flourishes not only in orchards and gardens but also in meadows and pastures. It actively crowds out valuable meadow grasses and worsens hay quality. In eating it, livestock receives many bitter essential oils. The weed affects man's respiratory system. It causes hay fever, asthma and allergies.

The senior inspector of the quarantine service of the Grodno OKPP, Yanina Antonovna Iodel, clarifies:

"In some European countries we come across this weed quite frequently. However, because of specific conditions or as a result of long-term biological measures it has been localized there and people have learned to deal with it

there. But if it manifests itself in a new place with similar climatic conditions it begins to multiply very rapidly. Additional material expenditures are required and as a consequence economic losses are incurred by the agricultural region."

Workers of the quarantine service find it necessary to deal with two categories of passengers. The first category includes those who are insufficiently informed about regulations concerning transporting vegetable and fruit seed, nursery plants, seedlings and food products. During the customs inspection they declare everything without concealment and are surprised if the seed material is confiscated for the purpose of disposal. Others, who know well which goods belong to the list of quarantine items, opt for all types of tricks in their desire to grow "miracle vegetables" or "miracle fruit" at their dacha or in the private plot.

Strawberry seedlings were once found in a trash bin during an inspection of an international train. At the quarantine post a large concentration of potato nematodes was discovered on the plants.

Here is a brief description of the potato nematode. It infests potatoes and several other vegetable crops. Cysts (colonies) of nematodes preserve their vitality for 8-10 years. Under favorable conditions the nematode emerges and lives on potato roots. A new generation is created every 40-70 days. It is very difficult to uncover the nematode immediately after infestation.

"Lovers of ripened agricultural products give us enough problems," says senior inspector Nina Fedorovna Shcherbak as she takes a bulky folder with confiscation reports out of a desk drawer. "The fact is that it is illegal to transport fresh vegetables, fruit and berries across the border. Nevertheless, people bring them. Recently the conductors of one of our cars discovered apples that belonged to 'no one.' All of the apples were infested with the San Jose scale. There is no reason to believe that there was an evil intent in bringing this fruit in. For the ill-informed individual these were just wormy apples. The worms could simply be cut out with a knife before eating the apples. but if this pest emerged here, we would not be able to count the tons of fruits and vegetables which would be lost! After all, on Belorussian territory this pest does not exist."

Here is a brief description of the San Jose scale. It destroys apple, pear, apricot and cherry trees. It affect up to 90 types of cultivated plants. When it finds itself in new conditions it multiplies swiftly. Nursery plants infested with it perish within 2-3 years. The offspring of the scale, the so-called 'wanderers,' are transported even on people's clothing and on work implements.

"Here is another sample of a quarantined 'tourist' from abroad," says Yanina Antonovna Iodel as she opens a plastic box with oblong seed resembling haricot beans. "Cowpeas," she explains. "They were confiscated in late May from two citizens of African developing countries. During questioning these individuals were silent about the quarantine goods in their baggage. When the items were discovered the individuals explained that they were bringing the cowpeas to prepare national dishes. When they learned that the cowpeas were

infested with a dangerous pest--the four-spotted weevil--and was not edible, they shrugged their shoulders in puzzlement."

The desire to eat a national dish when far from home is understandable, although from the point of view of the quarantine service compromises are intolerable here. But really, why bring a few kilograms of tomatoes over a thousand kilometers into another country, as did a tourist from the FRG [Federal Republic of Germany]? Before her trip she had apparently been told that this vegetable does not exist in the USSR. Meanwhile, her tomatoes were "stuffed" with the larvae of the potato moth. What the common wardrobe moth does to the clothes of a careless housewife is well-known. Its vegetable relative likes potatoes very much, leaving only the peel regardless of how the potatoes are stored.

I leaf through the record file of confiscations of quarantined goods--there have been 360 cases since the start of the year. This is an impressive figure if we consider that each document contains several individual cases of confiscation. When inspectors discover quarantine materials, they feel it is a good opportunity for an educational discussion. The prevention of violations is one of the main directions of their work. After all, most violations of the quarantine regimen are due to a lack of knowledge on the part of passengers.

Inspectors who wear the emblem of the golden ear of corn with a snake wrapped around it in their lapels work on a 24-hour basis. In addition to passenger trains they also inspect freight trains. The time that is allocated for this work is based on the trip schedule. It is necessary to discover biological "spies" literally in minutes without regard to rain, blizzards, frost or intense heat.

"Work conditions are still far from ideal for our inspectors," says the director of the OKPP quarantine service, Vladimir Nikolayevich Sezen." But by the end of the year we plan to put a new building into operation at the Grodno Railroad Station. We hope to have a facility which will provide better conditions for carrying out bioanalyses and for storing confiscated materials. In the last year changes have occurred in the technical outfitting of the quarantine service. Fumigation rooms are in operation. They enable us to disinfect small batches of some types of seeds and to return them to their owners. Soon x-ray equipment will appear at the post. With its help we will be able to more quickly assess infectivity of quarantined goods."

At present, workers in the quarantine service are studying intensively in the time they have free of primary obligations in accordance with a plan developed during the period of preparations for the Moscow international festival of youth and students. Although inspectors-biologists are not participants, they are directly involved in carrying out the festival. Their assignment is to uncover quarantine goods and to make a dependable barrier to weeds and agricultural pests which do not exist in our country.

In parting with the workers of the quarantine service I asked what they would like to suggest to people who will be taking a trip abroad. Yanina Antonovna Iodel expressed a common opinion:

"People should carry fewer agricultural products, should not pursue attractive labels and should believe advertisements less. In these attractive packages they may be bringing in pests that are dangerous to our flora."

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ACTIVITIES OF PHOTOENERGETIC REACTIONS IN WHEAT SHOOTS OF VARIETIES DIFFERING IN PRODUCTIVITY

Kiev FIZIOLOGIYA I BIOKHIMIYA KULTURNYKH RASTENIY in Russian Vol 17, No 3, May-Jun 85 (manuscript received 27 Mar 84) pp 275-279

[Article by V.F. Gavrilenko, T.V. Zhigalova and Ye.M. Bassarskaya, Moscow State University imeni M.V. Lomonosov, Leninskiye Gory]

[Abstract] A comparative analysis was conducted on the chloroplasts of highly and poorly productive winter and spring wheats, which demonstrated that the highly productive varieties were characterized by more efficient synthesis of ATP in cyclic and acyclic phosphorylation reactions. The highly productive winter wheats also possessed a more efficient electron transport system vis-a-vis low productivity winter wheats, a difference not evident in the spring wheats. Detailed analyses of highly productive (Saratovskaya-52) and poor (Erythrospermum-8202) spring wheats demonstrated that the shoots of the former were more efficient in light-dependent proton uptake, that the process functioned with maximal efficiency at a lower pH, and that the proton capacity of the chloroplasts was greater. Reconstruction studies on coupling factor 1 showed greater coupling activity in Saratovskaya-52 wheat than in Erythrospermum-8202, with further differences demonstrated on polyacrylamide gel electrophoresis. These observations indicate that breeding for high productivity in wheat involves selection for a more efficient coupling ATPase complex. Figures 5; references 10: 9 Russian, 1 Western.

12172/13046

CSO: 1840/1050

## PHOSPHOLIPID FATTY ACID COMPOSITION OF RICE VARIETIES DIFFERING IN COLD HARDINESS

Kiev FIZIOLOGIYA I BIOKHIYA KULTURNYKH RASTENIY in Russian Vol 17, No 3, May-Jun 85 (manuscript received 23 May 84) pp 279-283

[Article by N.V. Vorobyev, All-Union Scientific Research Rice Institute, Krasnodar, Belozernyy settlement]

[Abstract] An analysis was conducted on the fatty acid composition of shoots of rice varieties differing in cold hardiness in relation to growth temperatures. Cultivation of the plantings at 14 and 26°C showed that at the lower temperature the concentration of palmitic, stearic, and oleic acids was depressed, while that of linoleic and, to some extent, linolenic acid was increased. The degree of change in the concentration of these fatty acids was far more pronounced in the hardier varieties. Determinations of correlation coefficients for plants grown at 14°C showed a positive correlation for the rate of growth and palmitic acid concentration ( $r = +0.92 \pm 0.18$ ), and negative correlations ( $r = -0.84$  to  $-0.86$ ) for linoleic and linolenic acids. However, the correlation coefficient was positive ( $r = 0.93-0.95$ ) between the intensity of growth and linoleic and linolenic acid concentrations and negative ( $r = -0.75 \pm 0.29$ ) with respect to palmitic acid. References 11: 5 Russian, 6 Western.

12172/13046  
CSO: 1840/1050

## ARCHITECTURE OF PHOTOSYNTHETIC APPARATUS IN RICE VARIANTS DIFFERING IN PRODUCTIVITY

Moscow FIZIOLOGIYA RASTENIY in Russian Vol 32, No 4, Jul-Aug 85 (manuscript received 10 Oct 84) pp 651-660

[Article by T.Ye. Krendeleva, N.V. Nizovskaya, G.V. Tulbu, G.A. Khramova and M. Alauddin, Moscow State University imeni M.V. Lomonosov]

[Abstract] A comparative analysis was conducted on the structural inter-relationships of various energy-transforming components of thylakoid membranes, employing chloroplasts isolated from the highly productive rice variants Spalchik (USSR) and Aman (India, Bangladesh) and the lowly productive Dubovskiy (USSR) and Aush (India, Bangladesh). The combination of chemical and potentiometric studies revealed that the levels of complexes involved in the transformation of light energy from absorption to ATP synthesis were higher in the thylakoid membranes of shoots derived from the highly productive strains. In addition, the concentrations of the coupling and electron-transport complexes showed a greater increase than that of the

light absorbing complexes. The possibility remains open that the greater photosynthetic efficiency of the highly productive rice varieties is also complemented by changes in the membranes themselves, with the regulatory effects of other systems exerted via the membranes. Figures 4; references 21: 13 Russian, 3 Western.

12172/13046

CSO: 1840/1049

UDC 575.155.575.224.46:578.23

#### REVIEW OF KALININ BOOK ON BIOACTIVE SUBSTANCES IN PLANT BREEDING

Kiev FIZIOLOGIYA I BIOKHIMIYA KULTURNYKH RASTENIY in Russian Vol 17, No 6, Nov-Dec 85 pp 613-614

[Article by V.P. Lobov, reviewer of book "Biologicheski Aktivnyye Veshchestva v Rasteniyevodstve" [Bioactive Substances in Plant Breeding] by F.L. Kalinin, Naukova Dumka, Kiev, 1984, 1250 copies, 320 pp]

[Abstract] This book by Kalinin on the role of bioactive agents in plant breeding departs from conventional treatment of the subject by concentrating on the mechanism of action of such substances. The book consists of two parts, with the first part addressing the theoretical basis for employing such agents in agriculture and offers many original interpretations. A weakness noted in the first part is that the discussion of the theoretical foundations is cursory, which is presumably due to the limited number of pages in the book. Part two of the book represents the major contribution on this topic, dealing as it does with both the theoretical and applied ramifications of chemical control of plant growth and development. Kalinin presents an original scheme of classifying such agents into six categories on the basis of their mechanism of action and supplements each category with a clear-cut example. The book concludes with a discussion of the bioactive agents as effectors that alter endogenous autoregulatory systems at the genetic and metabolic levels.

12172/13046

CSO: 1840/1038

## SEARCH FOR AND INVESTIGATION OF SEX ATTRACTANTS OF SOME SPECIES OF MOTHS

Moscow AGROKHIMIYA in Russian No 11, Nov 85 (manuscript received 5 Feb 85)  
pp 113-116

[Article by A.L. Ilichev, Yu.B. Pyatnova, K.V. Lebedeva, G.B. Ivanova,  
S.N. Kurbatov and V.Kh. Taksidi, All-Union Scientific Research Institute of  
Chemical Plant Protecting Agents, Moscow]

[Abstract] Synthetic sex attractants are important agents for protection of plants. The following are principal components of sex pheromones: cis-11-hexadecenal (cis-11-HDA1), cis-9-hexadecenal (cis-9-HDA1), cis-5-tetradecenyl acetate (cis-5-TDac), cis-9-tetradecenyl acetate (cis-9-TDac), cis-7-tetradecenyl acetate (cis-7-TDac), cis-7-dodecenyl acetate (cis-7-DDac), and cis-7-dodecanol (cis-7-DDol). Some of these components were synthesized and then evaluated on cotton fields in Central Asia in respect to their activity, specificity towards various species of moths, and the ability to apply them in the field. Synthetic sex attractants of dart moth and moth C-black were highly active and specific. Black cutworm sex attractant was nonspecific, attracting primarily moles of winter moth. cis-7-DDac attracted the drop moth instead of the expected gamma moth. The following agents were found to be the best for detection of specific moth species and monitoring their population: cis-5-TDac and cis-9-TDac for the dart moth; cis-7-TDac for C-black moth; cis-7-DDac for the drop moth, and cis-5-Dac for the convolvulus moth. References 13: 3 Russian, 10 Western.

7813/13046  
CSO: 1840/304

## EFFECTS OF NITRIFICATION INHIBITORS IN COMPLEX FERTILIZER SUSPENSIONS ON SOIL MICROORGANISMS

Riga IZVESTIYA AKADEMII NAUK LATVIYSKOY SSR in Russian No 11, Nov 85  
(manuscript received 12 Apr 85) pp 112-116

[Article by V.A. Mezharaupe and D.Ya. Kreslinya, Institute of Microbiology  
imeni Avgust Kirkhenshteyn, Latvian SSR Academy of Sciences]

[Abstract] To prevent nitrogen losses from the soil and formation of toxic nitrogenous compounds, nitrification inhibitors were added to complex liquid fertilizers with anhydrous ammonia to assess their effects on soil microorganisms. Trials with N-serve 24E (2-chloro-6-(trichloromethyl)pyridine; Dow Chemical, USA) and ATC-60 (4-amino-1,2,4-triazole HCl; Japan) used in fertilizers applied under corn and barley plants demonstrated their effectiveness in inhibiting nitrifying bacteria on dernovo-podzol and dernovo-carbamate soils. The inhibitory effects persisted for 4-7 weeks with respect

to the bacteria, without affecting other members of the microbial ecosystem in the soil. Inhibition of nitrification by the inclusion of inhibitors in liquid fertilizers appears to allow for a more efficient and safer use of nitrogen resources in agriculture. References 11: 5 Russian, 6 Western.

12172/13046  
CSO: 1840/327

UDC 576.852.1+582.288

#### DECOMPOSITION OF STRAW LIGNOCELLULOSE BY STREPTOMYCES CULTURES

Riga IZVESTIYA AKADEMII NAUK LATVIYSKOY SSR in Russian No 11, Nov 85  
(manuscript received 15 Apr 85) pp 103-105

[Article by D.Ya. Pavlovicha, A.Ya. Apine, A.F. Apsite and M.P. Leyte,  
Institute of Microbiology imeni Avgust Kirkhenshteyn, Latvian SSR Academy  
of Sciences]

[Abstract] Two strains of streptomycetes isolated from the soil in Latvia were found effective in degrading lignocellulose of pulverized straw at 29°C. *Streptomyces fulvoviridis* A-42 degraded up to 42.1% of the lignin and *Str. endus* 5 up to 14.6% in batch culture. The corresponding degrees of destruction of hemicellulose were 40.2% and 19.6%, respectively. In addition, *Str. endus* 5 also possessed cellulolytic activity, which was absent in *Str. fulvoviridis* A-42. Such cultures can have obvious applications in reducing the lignin content of straw used for fodder. References 7: 2 Russian, 5 Western.

12172/13046  
CSO: 1840/327

UDC 575.1:633.16

#### GENETIC CONTROL OF PRODUCTIVE TILLERING IN BARLEY AFTER PREPLANTING SEED TREATMENT WITH ELECTRIC FIELD

Moscow GENETIKA in Russian Vol 21, No 3, Mar 85 (manuscript received  
2 Nov 83; 2 Apr 84) pp 450-459

[Article by A.N. Stroganov, All-Union Scientific Research Institute of  
Agricultural Electrification, Moscow]

[Abstract] An evaluation of the genetic control of tillering in 5 parental varieties of barley (Krasnodar, Ob, Viner, Moscow 121, Nadya) and 20 diallel crosses was studied in a system involving preplanting exposure of the seeds to a stationary electric field [A.N. Stroganov and V.A. Dragavtsev, *Genetika*, 19(9): 1523, 1983] The seeds were sowed in a random fashion with untreated control seeds in field trials, and diallel analysis was conducted separately

for direct and reciprocal hybrids [B.I. Hayman, Genetics, 39(6): 789, 1954]. Electric field pretreatment was found to diminish genotypic differences in the degree of tillering and was accompanied by decrease in  $V_r$  and  $W_r$  values, resulting from approximation of the values of extreme genotypes to a common level. The dispersion characteristics indicated that, on the average, expressivity of additive and dominant genes diminished to the same extent. This fact suggested that with reduction of the importance of strain-specific genes in genetic regulation of tillering, greater regulatory role was assumed by genes common to the parental varieties. Figures 1; references 7: 6 Russian, 1 Western.

12172/13046  
CSO 1840/324

UDC 631.4

#### EFFECT OF STIROMAL ON WATER-PHYSICAL PROPERTIES OF CHERNOZEM

Leningrad VESTNIK LENINGRADSKOGO UNIVERSITETA: BIOLOGIYA in Russian No 4, Nov 85 (manuscript received 23 Jan 85) pp 70-74

[Article by O.G. Rastvorova, V.S. Zuyev, I.A. Katicheva and N.R. Bashliy]

[Abstract] Application of stiromal--copolymer of styrene and maleic anhydride on turf--podzol and salty soils improved their structural composition and lowered the capillary rise of water. In the past, evaluation of stiromal was carried out only on poor soils; currently, even good soils are being degraded and depleted. Therefore, it was of interest to find out whether stiromal could recover structural state of chernozem and optimize its water properties. Hydrolyzed stiromal (HS) was applied to a typical acreage in Belgorodskaya Oblast in doses of 0.025, 0.05, and 0.1% of the soil mass treated. Water was used on control segments. The results were satisfactory: HS showed significant beneficial effects on physical properties of old arable clayed chernozem: its structural indices improved, sample settlement was lowered during dehydration, capillary rise of water dropped, lowering its nonproductive evaporation. Figures 2; references 10 (Russian).

7813/13046  
CSO: 1840/318

## BIOPHYSICS

### NATURE AND TECHNOLOGY

Moscow USSR (T/S) TASS IN RUSSIAN FOR ABROAD in English 1703 gmt 2 Dec 85

[Text] Soviet scientists have suggested using biological systems, in particular rhodopsin, as computer memory elements. Rhodopsin was discovered comparatively recently in the membranes of certain bacteria and in human and animal retinas. The substance operates like a microscopic power station and converts light energy into electrical energy. Rhodopsin's phenomenal capacity could be used, according to scientists, as a key element in technical appliances requiring the recording of a visual image and its retention in memory.

At the USSR Academy of Sciences Biophysics Institute, under the leadership of its director, Genrikh Ivanitskiy, it has been found that rhodopsin continues to work even when separated from bacteria: under the action of light, the molecules of the compound change color. If the rhodopsin is subsequently dehydrated, the image of an external object becomes as if fixed.

Soviet biophysicists propose using films made from this compound as micro-components of high-capacity optical computer memory: the disc of a long-playing gramophone record coated with rhodopsin could record information contained in several encyclopedia volumes.

Prof Ivanitskiy considers that so far these experiments are at an early stage, but Soviet scientists have already demonstrated the principle of ability to utilize nature's "patents" in present-day designs, in particular its biophysical potential.

For example, biological enzymes are used as components in power-unit catalysts. Synthetic blood, working on the principles of natural blood, has already been tested on animals and on men. Preservative compounds for prolonged storage of transplantable organs have also been created. The mechanical laws according to which animal muscles work are widely used in technology, too. And although the most primitive robot imitating the human hand can lift loads measured in tons, dozens of the most complicated computers are needed to evaluate a working situation in a fraction of a second, as the human eye does. This is where biophysical systems installed inside computers will come to the rescue.

/13046

CSO: 1840/338-E

UDC 577.344+577.354.2

RELATIONSHIP BETWEEN INTENSITY OF PEROXIDE OXIDATION OF LIPIDS AND FUNCTIONAL ACTIVITY OF RETINAS

Baku DOKLADY AKADEMII NAUK AZERBAYDZHANSKOY SSR in Russian Vol 41, No 8, Aug 85 (manuscript received 27 Sep 83) pp 44-47

[Article by A.I. Dzhaferov, E.M. Kuliyeva and N.K. Neyman-Zade, Institute of Physiology imeni A.I. Karayev, AzSSR Academy of Sciences]

[Abstract] Effect of induced peroxide oxidation of lipids (POL) on functional state of isolated and intact retina was studied under conditions of different light adaptation along with possible changes of this effect under action of antioxidants. Experiments were done on guinea pigs, showing that light adaptation intensified POL. During this period, malonic dialdehyde (MDA) content in retinas reached a maximum, returning to normal during adaptation to darkness. This effect was directly related to light intensity (higher maximum, longer time required for normalization). Administration of antioxidants shortened the time needed to achieve this maximum as well as the normalization time. These observations were analogous in vivo and in vitro. The changes in functional activity of retina with conditions of light adaptation are accompanied by reversible intensification of POL. Figures 3; references 12: 6 Russian, 6 Western (2 by Russian authors).

7813/13046

CSO: 1840/301



OPTIMAL CONTROL OF INFORMATIONAL RECORDING SYSTEMS BASED ON ADSORPTIVE PHENOMENA

Riga IZVESTIYA AKADEMII NAUK LATVIYSKOY SSR in Russian No 12, Dec 85  
(manuscript received 22 Apr 85) pp 86-93

[Article by L.G. Sedykh and M.Zh. Kristapsons, Leningrad Order of the Red Banner of Labor Institute of Textile and Light Industry imeni S.M. Kirov; Institute of Microbiology imeni Avgust Kirkhenshteyn, Latvian SSR Academy of Sciences]

[Abstract] Mathematical considerations are presented for optimal control of information recording systems, such as can be applied to biotechnological processes in terms of adsorptive phenomena. The latter phenomena encompass such commonly utilized techniques and methodologies as various chromatographies, membrane selective electrodes, control devices for monitoring liquid paraffins in culture media, biosensor transformers, etc. The specific topics covered include control of sample parameters, management and control of economic criteria, and studies on oscillating processes. Previously-advanced mathematical models for optimal monitoring of adsorption-desorption information are also discussed, with determination of vertical and horizontal asymptotes. Finally, examples of results obtained with and without computer-based data processing are presented for several bacterial systems producing amylolytic, pectolytic, and proteolytic enzymes, exemplifying the greater efficiency of automated process control. References 26: 15 Russian, 11 Western.

12172/13046  
CSO: 1840/307

MORPHOLOGICAL MANIFESTATIONS OF PLASMID MARKERS BEARING TETRACYCLINE  
RESISTANCE OPERON

Riga IZVESTIYA AKADEMII NAUK LATVIYSKOY SSR in Russian No 12, Dec 85  
(manuscript received 17 May 84) pp 94-98

[Article by N.A. Matyushkova and I.O. Muzhniyeks, Latvian Order of the Red  
Banner of Labor State University imeni P.Stuchka]

[Abstract] Gross morphologic studies were conducted on *E. coli* K-12 strains carrying series pBR:pBR313 and pBR325 plasmids with active Tc operon to determine whether the latter is expressed in colonial features. Examination of the colonies on 1.5 mm thick LB agar media in Petri dishes showed no differences between clones of plasmid-bearing and nonbearing *E. coli* cells when side illumination was employed. However, with vertical illumination, the plasmid-bearing cells showed greater translucence on the LB agar medium. No such differences in translucence were evident on M9 or PA media. In addition, dilution of the LB medium with physiological saline in 3:1, 1:1, and 1:3 ratios diminished the translucence of the plasmid-bearing clones. Cells bearing plasmids with inactive Tc operon were also nontranslucent. These observations constitute the first report of a relationship at the gross morphologic level between the functional activity of the Tc operon of recombinant plasmids in the pBR series and colonial translucence of *E. coli* K-12 cells. The technique may be utilized as a convenient screening method for cells bearing plasmids with active Tc operon. Figures 2; references 18: 6 Russian, 12 Western.

12172/13046  
CSO: 1840/307

## OPTIMAL CONTROL OF MICROBIAL BIOSYNTHESIS WITH REGULATED SUBSTRATE INFLOW

Riga IZVESTIYA AKADEMII NAUK LATVIYSKOY SSR in Russian No 12, Dec 85  
(manuscript received 22 Apr 85) pp 102-106

[Article by L.G. Sedykh and M.Zh. Kristapsons, Leningrad Order of the Red  
Banner of Labor Institute of Textile and Light Industry imeni S.M. Kirov;  
Institute of Microbiology imeni Avgust Kirkhenshteyn, Latvian SSR Academy of  
Sciences]

[Abstract] Standard differential equations applicable to growth curves were applied to the determination of optimal inflow of medium for the support of maximal microbial biomass concentration. Extremization of linear integrals by the Green method for batch and continuous cultivations was then applied to a *Candida skottii* culture to determine optimal medium supply schedules. Greater biomass concentrations were achievable with optimal growth control

exerted via regulation of substrate inflow than with conventional adherence to static factor parameters within the same reactor volume. The effects of closely controlled substrate inflow were particularly telling in situations with high densities of microbial cells necessary for optimal fermentation efficiency. Figures 2; references 10: 8 Russian, 2 Western.

12172/13046  
CSO: 1840/307

UDC 576.8.095.23

# EFFECT OF MEDIUM REDOX POTENTIAL ON METABOLISM OF ETHANOL-PRODUCING ZYMOMONAS MOBILIS

Riga IZVESTIYA AKADEMII NAUK LATVIYSKOY SSR in Russian No 11, Nov 85  
(manuscript received 6 Jun 85) pp 77-80

[Article by L.M. Pankova, Yu.E. Shvinka, M.Ye. Beker, E.E. Slava and Yu.Ya. Laynis, Institute of Microbiology imeni Avgust Kikhenshteyn, Latvian SSR Academy of Sciences; Latvian Order of the Red Banner of Labor State University imeni P. Stuchka]

[Abstract] In order to optimize processes relying on *Zymomonas mobilis*, studies were conducted with the effects of culture medium redox potential (-340 to +20 mV) on the activity of key pathways for glucose catabolism, physiological coefficients, and oxygen metabolism in air-tolerant strain. Catabolic activity was activated by low (-340 mV) redox potentials, while an increase in the potential brought about by dissolving oxygen led to activation of the NADH oxidase system and an increase in oxygen consumption. Concomitantly, the activities of enzymes involved in glucose breakdown diminished, and there was a partial shift to ethanol utilization. Intensive aeration, leading to a redox potential of +20 mV, resulted in complete inhibition of metabolic activities of *Z. mobilis*. Reduction of the redox potential by the addition of a chemical reducing agent,  $\text{Na}_2\text{S}_2\text{O}_4$ , increased sugar utilization in a molasses medium and increased yield of ethanol. Figures 1; references 11: 5 Russian, 6 Western.

12172/13046  
CSO: 1840/327]

## DISPERSION ANALYSIS OF PRODUCTIVITY OF DIFFERENT YEAST STRAINS

Riga IZVESTIYA AKADEMII NAUK LATVIYSKOY SSR in Russian No 11, Nov 85  
(manuscript received 31 May 85) pp 84-86

[Article by D.Ya. Karklinya and A.Ya. Liyelpetere, Institute of Microbiology imeni Avgust Kirkhenshteyn, Latvian SSR Academy of Sciences]

[Abstract] Several saccharomycetes (*S. cerevisiae*, *S. oviformis*, *S. uvarum*, *S. chodatii*) were subjected to dispersion analysis in order to determine the factors of primary importance in the production of different metabolites. Analysis of the fermentation processes demonstrated that strain selection is of primary importance over other factors in the production of glycerol and ethanol. However, strain selection was of secondary importance in the production of aldehydes and volatile acids, where the importance of temperature was preeminent. References 8: 6 Russian, 2 Western.

12172/13046  
CSO: 1840/327

UDC 581.198+581.132

## PREPARATIVE RECOVERY OF CYTOKININ-LIKE COMPOUNDS FROM MICROBIAL CULTURE MEDIA

Riga IZVESTIYA AKADEMII NAUK LATVIYSKOY SSR in Russian No 11, Nov 85  
(manuscript received 14 Mar 85) pp 87-88

[Article by E.P. Miklashevichs, I.V. Mishke and M.K. Teveleva, Institute of Microbiology imeni Avgust Kirkhenshteyn]

[Abstract] In order to meet the demands for cytokinin-like compounds in the USSR and decrease the cost of production, studies were conducted on extractive procedures on a preparative scale utilizing Soviet equipment and reagents. Successful preparation of cytokinin from the culture fluid of *Pseudomonas stutzeri* was obtained in a batch method from a 5-liter FU-8 reactor with ARA-5p ion-exchange resin at pH 9-14. The recovery from the culture medium was on the order of 45% following elution with distilled water, formic acid, and hydrochloric acid from the resin, lyophilization, recrystallization from ethanol, and extraction with boiling ethanol. References 8: 6 Russian, 2 Western.

12172/13046  
CSO: 1840/327

PRIMARY ACCOMPLISHMENTS IN MICROBIOLOGICAL AND BIOTECHNOLOGICAL RESEARCH IN  
11TH FIVE-YEAR PLAN

Riga IZVESTIYA AKADEMII NAUK LATVIYSKOY SSR in Russian No 11, Nov 85 pp 3-11

[Article by M.Ye. Beker and Yu.O. Yakobson]

[Abstract] During the 11th Five-Year Plan, research at the Institute of Microbiology imeni Avgust Kirkhenshteyn of the Latvian SSR Academy of Sciences touched just about every area of fundamental and applied microbiology. To complement studies in biotechnology, two pilot plants were opened at the Uzvar and Ogre collective farms to deal with, respectively, the biotechnology of feed and agricultural waste products processing. Other equally interesting and important advancements included the identification of new highly productive producers of citric acid (*Aspergillus niger*), lysine (*Brevibacterium flavum*), asparaginase (*Erwinia carotovora*), and cytokinins (*Pseudomonas stutzeri*), to name just a few. The Institute has also taken steps to modernize its facilities and acquire the latest in research equipment and instrumentation and has expanded and improved its bioengineering department. References 42: 30 Russian, 12 Western.

12172/13046

CSO: 1840/327

## ECOLOGY

### SOME CAUSES OF YEAR-TO-YEAR CHANGES IN DISTRIBUTION OF ZOOPLANKTON IN KANDALAKSHA BAY, WHITE SEA

Vladivostok BIOLOGIYA MORYA in Russian No 4, Jul-Aug 85 (manuscript received 9 Feb 83) pp 9-16

[Article by R.V. Prygunkova, White Sea Biology Station, Zoology Institute USSR Academy of Sciences, Leningrad]

[Text] [English summary] Ten years of study of the composition and distribution of zooplankton in Kandalaksha Bay showed that in the spring-summer period the biomass of zooplankton is higher in the near-shore than in the open areas and its values usually decrease with depth. Some deviations from the mean annual records were however observed. In the years with different temperature conditions species of different ecological nature, either warm-water or cold-water, were dominant in the upper water layers, but eurybiotic species more frequently constituted the bulk of zooplankton. As the result of the change of dominant forms high values of biomass were recorded in different parts of the bay in different years. Below 25 m depth the composition of zooplankton varied little; an arcto-boreal species *Pseudocalanus elongatus* usually dominated.

/13046

CSO: 1840/323-E

# FORMATION OF FOULING COMMUNITIES ON LONG-DISTANCE SHIP IN TROPICAL WATERS

Vladivostok BIOLOGIYA MORYA in Russian No 4, Jul-Aug 85 (manuscript received 5 Sep 84) pp 16-20

[Article by A.Yu. Zvyagintsev and S.R. Mikhaylov, Laboratory of Shelf Communities, Institute of Biology of the Sea, Far Eastern Scientific Center, USSR Academy of Sciences, Vladivostok]

[Text][English summary] The course of succession of fouling communities on the R/V "Akademik Nesmeyanov" during her 3rd cruise is analyzed. The settling of larvae of fouling macroorganisms began in the region of Seychelle Islands 2.5 months after docking. The fouling community comprised 20 species; *Balanus* gr. *amphitrite*, *Lepas* *anatifera* and *Enteromorpha* *clathrata* prevailed. The total biomass of fouling organisms was 1.5 kg/m<sup>2</sup>. Mass mortality of *B.* gr. *amphitrite* and *L.* *anatifera* caused by low salinity was observed after anchorage in the Ho-Chi-Min port, while *E. clathrata* survived. The settling of *B.* gr. *amphitrite* was resumed during operations in the coastal waters of Vietnam.

/13046

CSO: 1840/323-E

## ENVIRONMENT

UDC 581.47(116)

### TRENDS IN ANTHROPOGENIC CHANGES IN UKRAINIAN PLANT COVER

Leningrad BOTANICHESKIY ZHURNAL in Russian Vol 70, No 4, Apr 85 (manuscript received 12 May 83) pp 451-463

[Article by Yu.R. Shelyag-Sosonko, T.L. Andriyenko, V.V. Osychnyuk and D.V. Dubyna, Institute of Botany imeni N.G. Kholodnyy, Ukrainian SSR Academy of Sciences, Kiev]

[Abstract] A minireview is provided of man-induced changes in the plant cover of the Ukraine in recent decades, encompassing specific data on forests, meadows, bogs, steppes, and aquatic plants. Approximately 30% of the Ukrainian territory is under natural plant cover, with the largest area encompassed by forests (13.7%) and meadows (9.7%). Although vegetation in the Ukraine has been well studied, only during the last 10-15 years have more extensive studies been conducted on the effects that human activity has on the plant communities. As a result of aggressive reforestation, that area occupied by forests has actually shown an increase. However, the use made of forests has resulted in poorer and younger ecologic communities. Similar changes are noted in the other areas, pointing to a general reduction in the variety of plants and gradual disappearance of rare and unique plant species. In view of the high population density and rate of industrialization in the Ukraine, it appears that more intensive nature conservation measures are indicated. References 32: 19 Ukrainian, 13 Russian.

12172/13046

CSO: 1840/1062



## EPIDEMIOLOGY

UDC 616.61-002.151-036

### RESIDUAL MANIFESTATIONS AFTER HEMORRHAGIC FEVER WITH RENAL SYNDROME

Moscow SOVETSKAYA MEDITSINA in Russian No 6, Jun 85 (manuscript received 5 Apr 84) pp 101-103

[Article by A.I. Chukavina, G.K. Kustarnikov and V.V. Trusov, Chair of Infectious Diseases and No 2 Elective Therapy, Ustinov Medical Institute]

[Abstract] Tabular data are presented on long-term (up to 8 years) follow-up studies on 242 patients that had sustained hemorrhagic fever in combination with renal syndrome. Most (88%) of the patients were between 17 and 40 years old, with most (75%) having sustained a moderate-to-severe illness. The clinical observations and renal function studies showed that the convalescent period may last for a year or more after discharge from the hospital. A full return to health after 6 months, 9-12 months, and 2-3 years was evident in 21.5, 60.3, and 62.3% of the cases, respectively. The sequelae most commonly encountered were postinfectious asthenic syndrome, postinfection myocardiodystrophy, nephroangiopathy, nephroangiosclerosis, diencephalic syndrome, polyradiculitis, pituitary insufficiency, and symptomatic hypertension. These findings indicate that long-term follow-up of such patients constitutes an optimal management regimen. References 12: 10 Russian, 2 Western.

12172/13046  
CSO: 1840/1056

UDC 616.927-036.2+616.927-084

### EPIDEMIOLOGY AND PREVENTIVE TREATMENT FOR TYPHOID AND PARATYPHOIDS

Moscow MEDITSINSKAYA SESTRA in Russian No 7, Jul 85 pp 6-11

[Article by G.V. Papina, First Moscow Medical Institute imeni I.M. Sechenov]

[Abstract] Although generally under control, the title diseases still can pose a threat of epidemic. Further, a slow increase of lung and other atypical forms of these diseases has been noticed, complicating early diagnosis. Etiology indicates over 1,200 forms and serotypes of the salmonella organisms causing these diseases, with some of the paratyphoid strains occasionally

infecting animals as well as humans. Although morphologically similar, the greater fermentive activity of the paratyphoid strains results in gas as well as acid formation. Surface O- and Vi-antigens and thermolabile H-antigens on the flagellae allow serologic typing. These organisms are fairly hardy; for example, they can survive up to 2 weeks in soil and as long as 8 weeks in food products. Paratyphoid B organisms exhibit the longest survivability on everyday household items. Epidemiologically, the spread of the organisms depends heavily on human infection. During the incubation period of 6-25 days, the organism multiplies in the lymph system and is not infectious. Once fever begins, the organism can be found in many body products, particularly the feces and urine. By the end of the first week of sickness, antigens also begin to appear and can be used diagnostically. During convalescence, the organisms are often no longer present, although individuals may act as carriers, sometimes for life. Observations indicate this may be as many as 5% of those who recover from typhoid and even more with paratyphoid, especially when associated with chronic liver or intestinal ailments. Carriers remain the basic source of infection and detection during routine medical checkups remains a main means of combatting its spread. Water transmission is more important with typhoid; large water sources can be infected by improperly treated sewage, but a wide variety of other water routes are met. Contaminated foodstuffs, especially dairy products, represent an important route of infection. Paratyphoid B can also be spread from infected hens through eggs. The most important preventive measure is an improvement in water sanitation. Only about half of those infected with these diseases actually go to medical facilities and then receive a correct diagnosis. All persons showing high fever should be hospitalized and carefully diagnosed with hemocultures; those shown to have these diseases should be held at least 21 days; they and persons living with them should be carefully treated. A most important measure is the identification of carriers and their removal from medically sensitive positions, such as food handler. Inoculations play a secondary role, protecting an individual but having little epidemiological effect, although regular inoculations of susceptible groups are important. Mass immunizations must reach at least 80% of the population to be effective; chemical vaccines are preferable because of their lower side effects. Mass inoculations are advisable only in regions of high exposure.

12672/13046  
CSO: 1840/1053

**FOOD TECHNOLOGY**

**AQUATIC MICROBIOLOGY CONFERENCE IN ASHKHABAD**

[Editorial Report] Ashkhabad SOVET TURKMENISTANY in Turkmen 19 September 1985 carries on page 3 a 300-word Turkmeninform report on the All-Union Conference on Aquatic Microgrowths to be held in Ashkhabad on 17 December. "Conference participants will hear reports and discussions on the modern successes of the microbiology industry, on the technology of producing and cloning aquatic microplants and on new foods and food products which can be made from aquatic microgrowths."

/13046

CSO: 1840/336-E

UDC 581(470.57):061.3

SCIENTIFIC CONFERENCE 'CONTRIBUTION OF BASHKIR BOTANISTS TO ACCOMPLISHMENT OF  
FOODSTUFFS PROGRAM'

Leningrad RASTITELNYYE RESURSY in Russian Vol 21, No 4, Oct-Dec 85 (manuscript  
received 1 Sep 85) pp 547-548

[Article by Ye.V. Kucherov, Institute of Biology, Bashkir Branch, USSR  
Academy of Sciences, Ufa]

[Abstract] This paper gives a short summary of the program of the conference, held in November 1984 in Ufa, and organized jointly by the Bashkir Branch of the USSR Academy of Sciences and the Bashkir Section of the All-Union Botanical Society. A total of 58 papers were presented; they are summarized in a brochure with the same title as the conference, published by the Bashkir Branch Publishing House in Ufa in 1984 (92 pp). A large number of the papers concerned improvements to animal feedstocks, including the use of angelica (*Angelica archangelica*), both alone and in conjunction with other silage plants. Silphium (*Silphium perfoliatum*) is also attractive for silage, as it gives a yield of 700-1200 centner/ha with up to 15% protein and 4% fat (ash content up to 14%). Other silage additions, including several varieties of beans, can also improve protein content. Other papers discussed the suitability of various plants for use in pastures and the need for developing harmonious systems integrating man and his environment. Over 15 papers discussed improving productivity through the use of fertilizers, growth promoters, and even such industrial by-products as phosphate slag. The effects of petroleum contamination of the soil and of forestation programs were also examined, along with questions of soil algae. Finally, several papers addressed topics affecting agriculture, such as private farm plots and living conditions in the villages.

12672/13046  
CSO: 1840/1039

GENETICS

UDC 575.234.4:576.851.48

CHROMOSOMAL INVERSION IN E. COLI K-12 ACCOMPANIED BY ENHANCED EXPRESSION OF URIDINE PHOSPHORYLASE GENE

Moscow GENETIKA in Russian Vol 21, No 3, Mar 85 (manuscript received 25 Apr 84; in final form 25 May 84) pp 375-383

[Article by S.T. Kulakauskas, V.V. Sukhodolets and A.S. Mironov, All-Union Scientific Research Institute of Genetics and Breeding of Industrial Microorganisms, Moscow]

[Abstract] Genetic studies were conducted on E. coli K-12 mutants with enhanced expression of the structural gene for uridine phosphorylase (udp gene), which maps at 85 min of the E. coli chromosome. Selection on the basis of efficient thymine utilization led to the identification of mutants with transposon Tn10 in the metE gene closely linked with the udp gene. Mutants were also found that carried the Met<sup>-</sup> phenotype (designated udpPf) but had lost Tn10, which affected recombination in the metE-udp region. Such mutants fail to form cells with the Met<sup>+</sup> phenotype on transduction with phage P1 when wild-type donor is used. However, chromosomal homology in the metE-udp region is recovered at a higher frequency in transduction with P1 when a donor with the Tn10 element in the metE gene is employed. The transduction and conjugation data indicated that Tn10 induced an inversion, designated udpPfl, which encompassed a chromosomal segment approximately 3 min in duration between the localization of Tn10 (in metE) and the site of gene pyrE. Figures 1; references 25: 7 Russian, 18 Western.

12172/13046

CSO: 1840/324

## MUTAGENICITY IN CHLORELLA POPULATIONS INDUCED BY COMBINATION OF RADIONUCLIDES AND CHEMICAL MUTAGENS

Moscow GENETIKA in Russian Vol 21, No 3, Mar 85 (manuscript received 2 Sep 83; 29 Mar 84) pp 391-396

[Article by S.N. Ptitsyna, R.Ya. Shvobene, V.A. Shevchenko and S.A. Sergeyeva, Institute of General Genetics imeni N.I. Vavilov, USSR Academy of Sciences, Moscow; Scientific Research Institute for the Biological Testing of Chemicals, Moscow Oblast; Institute of Botany, Lithuanian SSR Academy of Sciences, Vilnius]

[Abstract] An analysis was conducted on mutagenicity dynamics in *Chlorella vulgaris* populations subjected to combinations of radionuclides and repair inhibitors. Exposure to Sr-90 ( $13 \times 10^{-4}$  Gy/liter) resulted in an increase in mutant cell counts by 2.7% by the 4th doubling cycle in comparison with control counts. Addition of acriflavine ( $10^{-5}$  M) or caffeine ( $10^{-3}$  M) was without statistically significant consequences for the mutant cell counts. Exposure to Ce-90 ( $6 \times 10^{-4}$  Gy/liter) raised the mutant cell counts by 2.5% by the 7th doubling cycle. A further significant elevation in mutant cell counts was obtained in combinations with caffeine or acriflavine, with the latter showing much greater enhancement of mutagenicity. The difference between the effects with Ce-90 and Sr-144 were attributed to much greater genetic damage induced by the former radionuclide and, hence, the more serious effects of repair inhibition by chemical agents. Acriflavine also potentiated ethyleneimine-induced mutagenicity, underscoring thereby the fundamental importance of repair mechanism in both radio- and chemical mutagenesis. Figures 4; references 12: 10 Russian, 2 Western.

12172/13046  
CSO: 1840/324

UDC 575.24:633.353

## DIRECT CURRENT MODIFICATION OF GAMMA-RADIATION MUTAGENESIS

Moscow GENETIKA in Russian Vol 21, No 3, Mar 85 (manuscript received 23 Feb 84) pp 460-463

[Article by N.N. Grigoryeva and V.G. Shakhbazov, Chair of Genetics and Cytology, Kharkov State University imeni A.M. Gorky]

[Abstract] Confirmatory studies were conducted on a previous report that direct currents can modify gamma-radiation mutagenesis in *Vicia faba* shoots. *V. faba* shoots with 20-22 mm primary roots were irradiated from a Co-60 source (1061 R/min; 250 R dose) before or after exposure to a 1, 3, or 10 mA D.C. for 30 min with either the anode or cathode placed on the meristem,

and subjected to a histologic analysis after 22 h. A 1 mA current was without statistical effect on the mitotic index, number of cells with chromosomal aberrations, or the number of chromosomal abnormalities per cell. A 3 mA D.C. was protective when applied either 15 or 150 min before or after gamma-irradiation with the anode on the meristem. However, with the cathode on the meristem, protection was only seen if the D.C. was applied 15 min before or after irradiation; when applied 150 min before or after irradiation, the number of cells with chromosomal abnormalities was greater (37-39%) than the number seen with irradiation alone (31%). A 10 mA current of either polarity depressed the mitotic index to below unirradiated and irradiated levels when applied 150 min before or after irradiation. With the cathode on the meristem, no effect was seen on irradiation-induced increase in cells with abnormalities, while placement of the anode actually raised the number of such cells from ca. 24% to ca. 35-37%. These observations point to the need for further studies on such phenomena to define the mechanisms involved. References 2 (Russian).

12172/13046  
CSO: 1840/324

UDC 633.11:633.14:631.523/.524

GENETIC FOUNDATIONS OF TRITICALE (X TRITICALE) PRODUCTION. PART 1.  
INHERITANCE OF QUANTITATIVE WHEAT AND RYE TRAITS IN WHEAT-RYE HYBRIDS AND TRITICALE

Moscow GENETIKA in Russian Vol 21, No 3, Mar 85 (manuscript received 16 Mar 84) pp 464-471

[Article by I.A. Gordey and G.M. Gordey, Belorussian Scientific Research Institute of Agriculture, Minsk Oblast]

[Abstract] An evaluation was conducted on the inheritance of various quantitative traits (plant height, tillering, spike size and number, grains per spike, etc.) of wheat (chromosomes AABBDD,  $2n = 42$ ) and rye (RR,  $2n = 14$ ) in  $F_1$  wheat-rye hybrids (ABDR,  $2n = 28$ ) and  $F_1$  triticale (AABB(D)RR,  $2n = 42-49$ ). Data on the combinational and polyploid effects of the wheat and rye genomes in the crosses under study demonstrated that the combination effect cannot always be directly correlated with the degree of expression of the traits in the parental strains. The specific combinational effect is insignificant with the general combinational effect and depends on the genotypic specificity of interaction of the parental genomes. Spike fertility usually shows a negative combinational effect and positive polyploid dose effect. A positive or a negative polyploid dose effect depends on the trend in the general combinational effect. Analysis of the results of systematic crosses also allows for studies on the importance of homo- and heterozygotic states of alleles on the expressivity of quantitative traits in triticale. Figures 4; references 10: 8 Russian, 2 Western.

12172/13046  
CSO: 1840/324

SEGREGATION OF EPISOMAL PLASMIDS IN MITOTIC AND MEIOTIC DIVISION IN  
SACCHAROMYCES CEREVISIAE

Moscow GENETIKA in Russian Vol 21, No 3, Mar 85 (manuscript received  
9 Jan 84; in final form 27 Jul 84) pp 508-510

[Article by O.V. Chepurnaya and I.A. Zakharov, Leningrad Institute of Nuclear  
Physics imeni B.P. Konstantinov, USSR Academy of Sciences]

[Abstract] Segregation of episomal plasmids in mitotic and meiotic division  
of *Saccharomyces cerevisiae* was studied in strains cotransformed with plasmids  
pYF91 and pFL2. During mitotic and meiotic cell divisions, the loss of each  
plasmid represented an independent event. However, in a number of cases, pFL2  
was preferentially retained in the mitotic progeny. No unequivocal evidence  
for the recombination of the plasmids was obtained. References 7: 1 Russian,  
6 Western.

12172/13046  
CSO: 1840/324

## MORPHOPHYSIOLOGICAL CHARACTERISTICS OF FEW-ROOT BARLEY MUTANTS

Novosibirsk IZVESTIYA SIBIRSKOGO OTDELENIYA AKADEMII NAUK SSSR: SERIYA  
BIOLOGICHESKIYE NAUKI in Russian No 2, Aug 85 (manuscript received  
28 Dec 83) pp 52-56

[Article by S.F. Koval and N.F. Olenina, Institute of Cytology and Genetics,  
Siberian Department, USSR Academy of Sciences, Novosibirsk]

[Abstract] An analysis was conducted on barley mutants producing few roots  
in comparison with the original strain, with the mutant strains obtained by  
treatment of Mary (Sweden) barley seeds with ethyl methanesulfonate (0.2%  
solution for 16 h). Growth in Petri dishes with nutrient medium or with tap  
water resulted in the formation of an average of 6.4 roots/plant by day 7 in  
the original strain, and 3.1-3.6 roots/plant in the mutants. The diminished  
formation of embryonic rootlets in the mutants was largely predicated on a  
reduction in root rudimentary structures form in embryogenesis, and to a  
lesser extent to some growth inhibiting factors (hormonal ?) in early develop-  
ment. In nutrient-poor situations, i.e., growth on water, inadequate  
development of the primary root system was somewhat compensated for by  
generation of coleoptile roots. The latter would suggest that in the mutants  
in nutrient-poor medium, root formation is influenced by genes that do not  
participate in root formation on nutrient-rich media. References 6:  
5 Russian, 1 Western.

12172/13046  
CSO: 1840/319



# NAPHTHALENE BIODEGRADATION PLASMIDS INCOMPATIBLE WITH Inc P-2 AND Inc P-7 GROUP PLASMIDS

Moscow GENETIKA in Russian Vol 21, No 4, Apr 85 (manuscript received 11 May 84) pp 522-529

[Article by V.V. Kochetkov and A.M. Boronin, Institute of Biochemistry and Physiology of Microorganisms, USSR Academy of Sciences, Moscow Oblast]

[Abstract] Naphthalene biodegradation plasmids, known so far, belong to two groups of noncompatibility: P-7 or P-9. In an earlier paper, results were reported of comparative study of 14 conjugative plasmids of naphthalene biodegradation found in *Pseudomonas* spp. In the present paper, classification of these plasmids by their incompatibility was reported. The plasmids of the P-9 group of incompatibility are characterized by an insignificant effect of surface exclusion in respect to R-plasmids of the Inc P-2 and Inc P-7 groups. In contrast to plasmids of Inc P-9 group, the naphthalene biodegradation plasmids of Inc P-7 exhibit a strong effect of surface exclusion against Inc P-2 and Inc P-7 group plasmids. Two plasmids of naphthalene biodegradation pBS218 and pBS219 revealed incompatibility with R-plasmids of two Inc groups: P-2 and P-7; they also control resistance to potassium tellurite. The results of this work expanded the list of naphthalene biodegradation plasmids classified by incompatibility characteristic. References 19: 8 Russian, 11 Western.

7813/13046  
CSO: 1840/325

# EFFECT OF INOSITOL DEPENDENCE MUTATION ON NUCLEI FUSION UPON CROSSING YEAST SACCHAROMYCES CEREVISIAE

Moscow GENETIKA in Russian Vol 21, No 4, Apr 85 (manuscript received 28 Oct 83, after revision 20 Jun 84) pp 556-563

[Article by L.V. Yurchenko, Leningrad Institute of Nuclear Physics imeni B.P. Konstantinov, USSR Academy of Sciences]

[Abstract] More than 15 genes are known which are responsible for the biosynthesis of inositol. Most of the mutations induced by ethylmethanesulfonate are located in *ino1* (70%) and *ino2*, *ino4* (9%). Inositol is a precursor in the biosynthesis of phospholipids of eukaryotic membranes without which the auxotrophic cells die rapidly in a culture. Using frequency of the formation of target and sector colonies of cytoductants during crossings as a test, the effect of a series of nonallele mutations of inositol dependence on nuclei fusion in zygote was studied. The data showed that inositol dependence mutations in four genes, upon crossing homozygous yeast

strains with  $[\text{rho}^0]$  testers on selective medium leads to formation of target (up to 12%) and sector (34%) cytoductant colonies and thus affects nuclei fusion in zygotes. In contrast to *ino4* and two mutations at unidentified foci, *ino1* mutation controlled only a delay of karyogamy, since only sector conductants frequency increased upon crossing on meiotic  $\alpha$  *ino1* segregants. The  $\alpha$ -allele of the mating type locus increased the effect of *ino* mutations. In this work, it was possible for the first time to relate karyogamy to a biochemical defect: a block in the biosynthesis of inositol. The damage of nuclei fusion in zygotes is a pleiotropic effect of inositol dependence, possibly connected to decreased level of inositol containing membrane phospholipids in the cells. References 24: 8 Russian, 16 Western.

7813/13046

CSO: 1840/325

IMMUNOLOGY

UDC 615.373:616-078.73-073.916].014.47:615.462].07

# CERTAIN PATTERNS OF IgG ADSORPTION BY POLYSTYRENE BEAD SURFACES

Moscow IMMUNOLOGIYA in Russian No 1, Jan-Feb 85 (manuscript received  
19 Feb 83) pp 19-21

[Article by M.K. Mamedov, Institute of Poliomyelitis and Viral  
Encephalitides, USSR Academy of Medical Sciences, Moscow]

[Abstract] Use of marked radioactive isotopes and antibody enzymes in association with homologous antibodies adsorbed on the surfaces of plastic carriers has contributed to immunological research. Various solid phase devices have been used for this purpose. The present article reports on tests of domestic Soviet polystyrene beads that permit a simplified modification of the enzyme-adsorption method to identify the alpha hepatitis virus and its antibody in nonspecialized, general laboratories. Only patterns of Ig immunoglobulin adsorption were studied. Human IgG was conjugated with the radioactive isotope <sup>125</sup>I by a chloramine method, with mean radioactivity and protein concentration measured frequently. Bovine serum albumin (BSA) and an anionic detergent "Tween-20," and a phosphate-salt buffer with 5.8-8.2 pH, were used to produce m-Ig and Ig. Adsorption involved incubation of the beads in various solutions, followed by measurement of their radioactivity. Results of several series of tests were subjected to Student-Fisher evaluation. This suggested that the presence of albumin in physiological concentrations in the solution had no important impact on m-Ig adsorption on the bead surfaces, which effectively adsorbed Ig from solutions without additional proteins, but also from Ig solutions containing serum albumin in physiological concentrations. Thus, it was possible to coat the beads with alpha Ig hepatitis virus. The "Tween-20" weak detergent was effective for eliminating unwanted protein adsorption. Figures 3; references 9: 1 Russian, 8 Western.

12131/13046

CSO: 1840/225

CHANGE IN ELECTROPHORETIC MOBILITY OF MACROPHAGES AFTER CONTACT WITH  
POLYSACCHARIDE ANTIGENS

Moscow IMMUNOLOGIYA in Russian No 1, Jan-Feb 85 (manuscript received  
16 Aug 83) pp 44-47

[Article by N.N. Zastrozhnova, V.A. Lyashenko, A.M. Sapozhnikov and  
Ye.P. Senchenkov, Institute of Immunology, USSR Ministry of Health, Moscow]

[Abstract] The role of macrophages in inducing synthesis of antibodies against T-independent polysaccharides is disputed, but the importance of the mediators they emit is clear. The present article reports on an attempt to determine whether the activation of macrophages of polysaccharide antigens was accompanied by changes in the surface charge of the cells and if the mobility of macrophages in an electric field could be used to evaluate the activation potential of a given polysaccharide. In addition, the authors compared changes in electrophoretic mobility of macrophages after their exposure to T-independent antigens and the development of known signs of macrophage activation, such as F-rosette-forming ability, development of the lysosomal apparatus, and induced chemiluminescence. Test antigens were E. coli and meningococcus polysaccharides and Vi-antigens of abdominal typhus bacteria. For electrophoretic tests, cells were incubated for 10 to 120 minutes at 37°C. Results indicated that electrophoretic mobility of peritoneal mouse macrophages increased markedly after the above incubation. The increase was irregular and depended on the structure of the antigen involved. Activation of the macrophages, rather than passive adsorption, was the key to the increase in electrophoretic mobility. Figures 3; references 13: 2 Russian, 11 Western.

12131/13046  
CSO: 1840/225

EFFECT OF INTERFERON AND LEVAMISOLE ON REACTION OF CELL IMMUNITY IN BREAST  
CANCER PATIENTS

Moscow IMMUNOLOGIYA in Russian No 1, Jan-Feb 85 (manuscript received  
14 Jun 84) pp 82-83

[Article by Z.R. Ter-Pogosyan, L.N. Mkrtchyan, A.M. Galstyan, V.P. Kuznetsov,  
A.M. Saakyan, M.A. Movsesyan and L.A. Kamalyan, Scientific Research Institute  
for Roentgenology and Oncology imeni V.A. Fanardzhyan, ArSSR Health Ministry,  
Yerevan]

[Abstract] The article reports on study of the modulating action of interferon (IF) and levamisole (L) on cell immunity reactions in vitro and in vivo for 44 breast cancer patients and 38 uterine cancer patients. The modulating

action of IF and L in vitro was studied in lymphocytes and leucocytes by incubation for 1 hour at 37°C. The immunologic action of IF and L was studied in 20 breast cancer patients in the second to third stage. They receive L after radical mastectomy for 4 weeks, along with other chemotherapy. Results indicated that 55-66% of patients underwent modulation through the effects of interferon and levamisole. The therapy had no noticeable effect on the content of complement-dependent rosettes in breast cancer patients. A correlation was perceived between in vitro and in vivo actions of IF and L, thus indicating a strong immunomodulating effect for interferon and levamisole for breast cancer patients who are sensitive to these preparations in vitro. References 3 (all Western).

12131/13046  
CSO: 1840/225

UDC 612.112.94.017.1-06:612.766.1

#### CHANGE IN FUNCTIONAL ACTIVITY OF T-SUPPRESSORS OF SVA-LINE MICE AFTER PHYSICAL BURDENS

Moscow IMMUNOLOGIYA in Russian No 1, Jan-Feb 85 (manuscript received 19 Dec 83) pp 83-84

[Article by Sh.B. Sadykov and T.N. Ganefel, Semipalatinsk Medical Institute]

[Abstract] The article reports on study of the functional activity of T-suppressors in various periods after a physical burden brought by swimming. Male mice of the SVA line (which react strongly to sheep erythrocytes), aged 6-8 weeks, were forced to swim for 1 hour in water with a temperature of 30°C. Then the functional state of cells was measured to determine the suppression of immune reaction in specific and nonspecific reactions. Next, cell suspensions from the spleens of donor rats were taken immediately and at 6, 12, 24, 48, and 72-hour intervals after the stress effects. Results showed that physical burdens affected the suppressing action of antigen-bonding cells as well as antibody-forming cells as soon as 6 hours after the physical burden, with the maximum suppression occurring 24 hours after the exertion. Three days after the activity, splenocyte activation returned; it was manifested in a decrease in antibody-forming cells. Either changes in suppressor functions or cell redistribution during lymphocyte migration under stress are cited as probable causes of these changes. References 4: 2 Russian, 2 Western.

12131/13046  
CSO: 1840/225

STIMULATION OF IMMUNE SYSTEM WITH POLYVINYLPYRROLIDONE IN PATIENTS WITH  
LARYNGEAL CANCER

Leningrad VOPROSY ONKOLOGII in Russian Vol 31, No 9, Sep 85 (manuscript  
received 10 Dec 84) pp 38-45

[Article by V.A. Kochetkova and Ye.I. Trofimov, Moscow Order of Labor's Red  
Banner Scientific Research Oncological Institute imeni P.A. Gertzen, RSFSR  
Ministry of Health]

[Abstract] In order to directly stimulate the B-lymphocytes and thus correct the frequently-observed immunological disturbances, 32 male patients with stage III laryngeal cancer were immunized with polyvinylpyrrolidone of relative molecular weight 40,000 directly on the palatine tonsils. Three doses of 2 ml of a 10% solution were administered at 3-day intervals, ending 5-7 days before surgery. The patients were compared to 32 controls treated with radiation and surgery only. Both groups were observed for 4 years. In the experimental group, five recurrences, with three regional and one general metastases, were seen in the first 1½ years; three patients died and two had repeat surgery. The remaining patients were still in remission after 4 years. In the control group, fifteen recurrences within 4 years were seen, with three regional and three general metastases and twelve deaths. The levels of IgM in both serum and saliva were elevated 1-1½ months after immunization, in comparison to both the controls and healthy individuals. IgA, IgG, and IgAs were not markedly affected. Recurrences were characterized by decreased levels of IgM and IgG in serum and saliva and IgAs in saliva, in both the experimental and the control groups. Changes were less marked in the immunized patients. The results indicate that polyvinylpyrrolidone immunization stimulates IgM synthesis in patients with laryngeal cancer, lowering the frequency of recurrences and metastases by a factor of three. References 24: 12 Russian, 12 Western.

12126/13046

CSO: 1840/220

## LASER EFFECTS

UDC 617.7-085/849. 19-092. 9

### BASIS FOR OPTIMAL SPACE-TIME CHARACTERISTICS OF TRANSSCLERAL LASER IRRADIATION AND ITS EXPERIMENTAL STUDY

Odessa OPTAMOLOGICHESKIY ZHURNAL in Russian No 3, 85 (manuscript received 18 Dec 84) pp 170-173

[Article by S.G. Legeza, physician and A.I. Privalov, senior engineer, Odessa Scientific Research Institute of Eye Diseases and Tissue Therapy imeni Academician V.P. Filatov]

[Text] The laser effect on intra-ocular tissues is achieved, as a rule, through a maximally dilated pupil.

However, there are certain pathological processes in intra-ocular membranes which are difficult or impossible to access with a transpupillary laser due to rigidity of the pupil, to opacification of the refracting media of the eye, and--mainly with the most peripheral membrane--to the "pre-oral" localization of these processes. These pathological processes include peripheral detachments and retinal tears, peripheral cysts, "retinoshisis" which is localized on the extreme periphery, intra-ocular tumors, etc.

The literature contains few reports about the transscleral laser effect on the eyes (M.V. Zaykova, V.I. Negoda, Yu.G. Fishkin, 1972; I.N. Ganichenko, L.A. Linnik, 1975; Ye. A. Kurzakov, V.G. Shilyayev, 1978; L.A. Linnik, A.I. Kolomiyets, I.B. Chokova, 1978; N.B. Rasskazova, A.A. Franchuk, 1978; P.I. Saprykin, A.Yu. Kalentyev, 1979; A.I. Kolomiyets, I.B. Chokova, 1980; Campbell et al., 1964; Smith, Stein, 1968; Beckman et al. 1972; 1973).

Not all of these studies concerned the possibilities of transscleral laser coagulation of the intra-ocular membranes, which has a number of advantages over surgical and transpupillary laser methods of treatment. For example, it eliminates conventional surgical intervention in the eyeball; it can prove to be a safe, bloodless, painless method of treatment, which requires no special preparation of the patient, and which makes it possible to have an effect on the intra-ocular membranes which are difficult

or impossible to reach with the transpupillary method of laser coagulation.

The sclera is a cloudy, non-transparent medium of mesenchymal origin; it is a dense, fibrous layer, which is lacking its own epithelial integument. It consists primarily of non-cellular formations, composed mainly of collagenous and fine elastic fibers immersed in a basic, amorphous substance. It also consists of an adhesive fiber of a substance which belongs to the so-called collagenous tissues and is partly laminar in construction; the fascicles, which are interwoven with each other, are located primarily in the meridional and equatorial directions.

The collagenous fibers and the ground substance which is located between them are characterized by the presence of a large quantity of mucoid substances in addition to the collagen.

Elastic fibers run parallel to the collagen fascicles. Flat connective cells, which are similar to tendinous cells, are located between the fibers in the sclera.

The sclera is completely lacking in transparency; it is white, with a tinge of light blue at times.

The spectral characteristics for the transmission and reflection of laser radiation by the sclera of the rabbit and the human eye according to the data of Smith and Stein (1968) are provided in Figures 1 and 2.

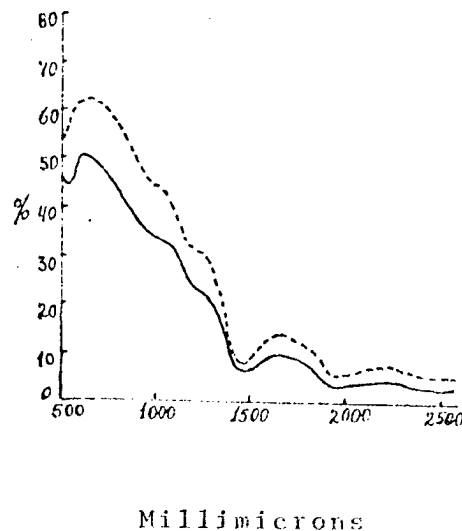


Figure 1 The percentage of light, reflected from an isolated sclera, the sclera of a rabbit eye: the sclera of a human eye (Smith and Stein)



By taking into account the complex morphological structure of the sclera, which consists of collagenous and elastic fibers 200 A in cross-section, which is much less than the length of a wave in the visible or near infrared range, one can envision it as a colloidal solution, and the dispersion of light which passes through the sclera as subject to Rayleigh's law. Consequently, the intensity of the light dispersion is directly proportional to the number of dispersing collagenous and elastic fibers and is inversely proportional to the wave length of the light to the fourth power.

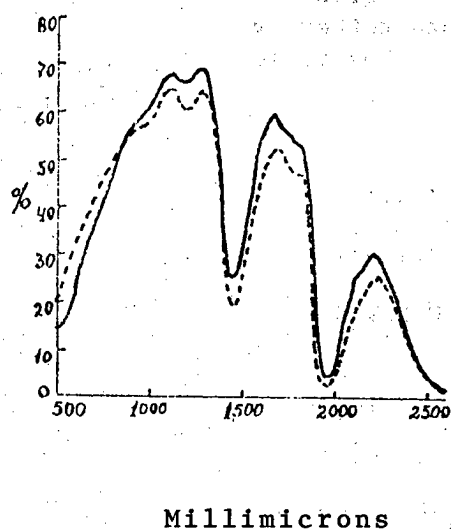


Figure 2. Percentage of light transmitted through an isolated sclera, — sclera of a rabbit eye, - - - sclera of a human eye (Smith, Stein).

According to calculations made on the basis of Rayleigh's formula the intensity of the radiation dispersed by the sclera will be less as the wave length of the radiation becomes greater and as the area of dispersion becomes smaller. With a neodymium laser, for example, the intensity of the radiation dispersion by the sclera is approximately 20 times less than for the radiation of the argon laser under identical conditions of irradiation.

Thus, on the basis of the spectral characteristics for the transmission and reflection of laser radiation by the sclera of the rabbit and the human eye, it can be suggested that the radiation of the neodymium laser will be the optimal choice for trans-scleral coagulation of the internal structures of the eye.

Substantiation of the space-time characteristics of trans-scleral laser irradiation is also important to the optimization of the irradiation processes for biological tissues.

According to the data in the literature, it is well known that the best time range for the coagulating effect on the intra-ocular membranes consists of units of milliseconds (Ham, 1980).

Current optical designs for transpupillary laser coagulation make it possible to obtain coagulates of 50 microns to 2 millimeters in diameter on the fundus of the eye.

The dimensions of the coagulates on the fundus of the eye vary either with a change in the point of divergence of the laser radiation or with change in the energy of the exposure.

Because the laser beam is dispersed as it passes through the sclera, the area of exposure increases to include the adjacent intra-ocular tissues. As a result, it is essential to use an optical collecting system to produce on the sclera a laser point of small diameter with great energy density. Thus, taking into account the irradiation conditions, the optimal focus distance of a single-lens optical system is 50-70 millimeters. In this case, the dimension of the laser beam focussed in the plane of the sclera is equal to 350-400 microns in diameter.

In order to substantiate experimentally the choice of laser type and to study the dispersion processes of the laser beam by the sclera in relation to its wave length experimental investigations were conducted on three types of lasers which operate in the visible wave range. It was not possible to study the dispersion characteristics of the neodymium laser beam by the sclera of the rabbit and the human eye because it was not possible under our conditions to photograph radiation in the near infra-red range of the spectrum.

The sclera from 60 enucleated rabbit eyes and 15 human eyes which had been removed for various reasons served as the material for the study.

The LG-106M argon laser, the LG-78 helium-neon laser and the "TsVET" ruby laser were used.

An experimental apparatus was assembled to carry out an investigation of the dispersion of laser radiation by the sclera of the rabbit and human eye by means of unified optical nodes; the schematic diagram of that apparatus is provided in Figure 3.

A 10 x 10 mm section of the isolated sclera, taken from the equatorial area of the eye, was put on a cover glass, with the outer side down.

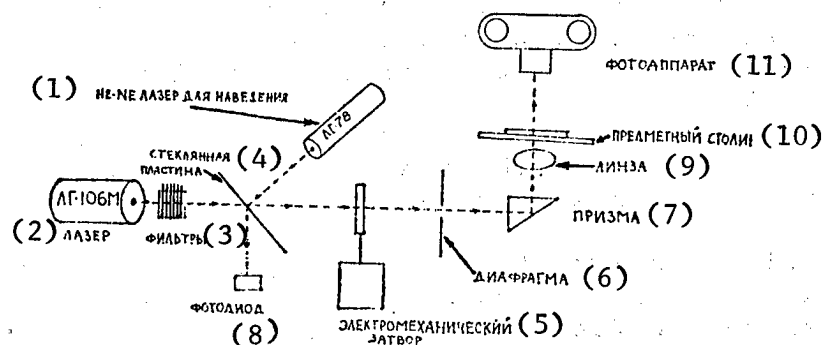


Figure 3 Schematic diagram of the experimental apparatus for producing a photographic record of the dispersion of laser radiation by the sclera.

Key:

1. Helium-neon laser for guidance
2. Laser
3. Filters
4. Glass plate
5. Electromechanical closure
6. Diaphragm
7. Prism
8. Photodiode
9. Lens
10. Stage
11. Camera

With the aid of a prism the laser beam was introduced under the cover glass with the sclera. The dispersed laser spot which was obtained on the inner surface of the sclera, was photographed using a "Zenit E" camera with adapter rings on "Foto 65" film. The film was processed in a standard developer and a light meter reading was taken on a "Karl Zeiss" microphotometer.

The data obtained were processed statistically. For a more graphic comparative evaluation of the obtained results we introduced the concept of the coefficient of laser ray dispersion by the sclera; this is the relation of the laser spot diameter to the inner and outer surfaces of the sclera (Table 1).

Table 1

Laser type	Wave length in mcm	Coefficient of laser radiation dispersion			
		parallel beam rabbit	parallel beam human	focussed beam rabbit	focussed beam human
Argon	0.48-0.51	1.4+0.08	1.5+0.03	9.0+0.003	10.1+0.05
Helium-neon	0.63	1.3+0.01	1.3+0.02	8.8+0.17	7.7+0.2
Ruby	0.69	1.2+0.008	1.2+0.02	8.7+0.1	7.6+0.09

From the data presented in Table 1 it is clear that the coefficient of laser beam dispersion differs for these types of lasers and becomes smaller in inverse proportion to the wave length of the radiation. In addition, a parallel laser beam has a smaller dispersion coefficient than a focussed one. Another noticeable fact is that a given element of the spectral characteristic of the rabbit sclera is close to that of the human sclera (9.0 and 10.1 for the argon laser, 8.8 and 7.7 for the helium-neon laser, etc.). It was established that the most substantial and reliable ( $p < 0.001$ ) differences in the degree of laser radiation dispersion by the rabbit and human sclera were found during the comparison of the argon and ruby lasers.

Thus, it was established by means of experimental investigation that the radiation of the ruby laser is dispersed by the sclera to a significantly lesser degree than is the radiation from the argon or helium-neon lasers; this follows from the table presented and is in line with Rayleigh's law.

The data obtained make it possible to suggest that radiation with a wave length of 1.06 micrometers, i.e., the neodymium laser, will experience even less dispersion. Based on data in the literature with regard to the spectral characteristics of the sclera and on the results of our research, as well as on theoretical calculations, it can be suggested that the neodymium laser should be the best for transscleral coagulation of intra-ocular membranes, with a high degree of localization and minimal dispersion.

Thus, on the basis of the experimental data obtained by us the following conclusions can be drawn:

1. Laser radiation is significantly dispersed by the sclera; the coefficient of this dispersion is inversely proportional to the wave length of the laser beam.
2. The difference between the coefficients for dispersion of the laser beam by the sclera of the rabbit and the human eyes is insignificant.
3. Of the three types of lasers used the least dispersion was obtained with the ruby laser.

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CSO: 1840/1004

ANATOMY AND TOPOGRAPHY OF LIVER OF APHALIN BLACK SEA DOLPHIN

Kiev VESTNIK ZOOLOGII in Russian No 3, May-Jun 85 (manuscript received 30 Dec 85) pp 73-76

[Article by V.Ya. Lukhanin, Institute of Zoology imeni I.I. Shmalgauzen, UkSSR Academy of Sciences]

[Text] The present paper contains data on the macroscopic structure and topography of the liver of the aphin Black Sea dolphin (*Tursiops truncatus ponticus* B). The material was taken from 12 animals. V. P. Vorobyev's preparation method was used, along with N. I. Pirogov's method for preparing the sections.

The liver of the aphin is an irregularly shaped parenchymatous organ, which, like in other mammals, is the largest organ of the digestive system. It is comprised of a soft material that is a reddish-brown color. It is located just behind the diaphragm in the anterior part of the abdominal cavity. It has anterior, inferior (ventral) (figure 1.2), two lateral--left and right (figure 1.3), and superior (dorsal) (figure 1.1) surfaces, which all together form the parietal or diaphragmatic surface (*facies parietalis s. diaphragmatica*), and the posterior--visceral surface (*facies visceralis*) (figure 1.4).

The antero-superior edge (*margo anterior superior*), the antero-inferior edge (*margo anterior inferior*), and antero-lateral edges (*margo anterior lateralis dexter et sinister*) of the liver are rounded. The super-posterior edge, and especially the infero-posterior (*margo posterior inferior*) and lateral posterior edges--right and left (*margo posterior lateralis dexter et sinister*) are pointed.

Between the anterior and ventral surfaces of the liver on the one side, and the diaphragm on the other side, are the parasagittal abdominal fold and the falciform ligament (*ligamentum falciforme hepatis*) (figure 1.2). Dorsally this ligament is split into the right and left coronal hepatic ligaments (*lig. coronarium hepatis dextrum et sinistrum*), that enclose the large vessels that pass longitudinally through the dorsal part of the liver. The ligaments disappear at a point that is more dorsal and caudal than where the vessels enter the liver, since here the liver is joined with the dorsal wall of the abdominal cavity almost along parasagittal lines in the area of the vertebral column. The peritoneum extends along the exterior edge of the zone in which it is joined to the liver directly to the wall of the abdominal cavity. The ventral part of the falciform ligament extends caudally to the infero-posterior edge of the liver at the cleft, where it joins with the round ligament (*lig.*

teres hepatis), which is the cord of the healed-over umbilical vein. This notch is called the umbilical incisure (*incisura umbilicalis hepatis*) and is located between the right and left lobes of the liver. On the posterior (visceral) surface of the liver the umbilical cleft continues into the sagittal or longitudinal sulcus (*sulcus hepatis sagittalis*).

The falciform ligament from the front and from below, the longitudinal sulcus and the round ligament attached to it on the posterior surface, the umbilical cleft along the infero-posterior edge and the point at which the large vessels pass along the dorsal surface of the liver separate the liver into the right, and larger, lobe, and the left lobe (*lobus hepatis dexter et sinister*).

From the front, the bottom, and along the sides the liver's relatively smooth surface fills the concavity of the diaphragm that fits tightly up next to it, and corresponds to the forms of the adjacent abdominal wall and the organs of the thoracic cavity that are located to the front. The inferior, anterior, lateral surfaces and almost the entire dorsal surface of the liver are covered by the diaphragm.

The anterior surface of the left lobe of the liver is bounded via the diaphragm by the posterior surface of the left lung and the left ventricle of the heart. The anterior surface of the right lobe is bounded by the posterior surface of the right lung and the right ventricle of the heart. The apex of the heart lies adjacent to the suture located along the antero-posterior edge of the liver between the left and right lobes and forms the cardiac impression (*impressio cardiaca*).

From the front and above the liver lies adjacent via the diaphragm to the inferior surface of the posterior sections of the lungs. Also adjacent to the left lobe of the liver here, to the left of the middle line, is the esophagus and the prediaphragmatic lymph node, which form the esophageal impression (*impressio oesophagea*) (figure 2). From above, the abdominal aorta, the posterior vena cava, and nerves pass through a longitudinal channel separated by partitions, between the two lobes of the liver. The lateral and inferior surfaces of the liver are adjacent via the diaphragm to the lateral and ventral parts of the abdominal wall.

The inferior horizontal and ascending parts of the duodenum, the intestinal ampulla, and the right surface of the tip of the pancreas lie adjacent to the right lobe from behind, and they enclose the porta of the liver, additional lobes of the spleen, and loops of the small intestine. The first and second sections of the stomach, and the vestibule of the stomach lie adjacent to the left lobe from behind, and form the deep and wide gastric impression (*impressio gastrica*), the bulb and descending portion of the duodenum, and the loops of the small intestine. The duodenum forms the duodenal impression (*impressio duodenalis*), which is located primarily on the posterior surface of the right lobe of the liver, but also partially on the posterior surface of the left lobe near the sagittal sulcus.

The intestinal ampulla also forms a noticeable impression (*impressio ampullaris*). The broad small intestinal impression is located more laterally

(*impressio tenueintestinalis*). The less pronounced small intestinal impression is also located on the posterior surface of the left lobe of the liver.

The porta of the liver are located on the posterior surface of the right lobe in the middle, near the sagittal sulcus. The porta are the point at which the portal vein (*v. portae*), the hepatic artery (*s. hepatic propria*), and nerves enter the liver, and the point at which the lymphatic vessels and hepatic duct (*ductus hepaticus*) leave the liver. Like other cetaceans that have been studied, the aphalin has no gall bladder. Therefore, the hepatic duct, penetrating the pancreas, joins with the pancreatic duct directly and forms the hepatic-pancreatic duct. The latter passes through the wall of the intestinal ampulla and opens into the intestinal cavity near the ampulla-intestinal flexure.

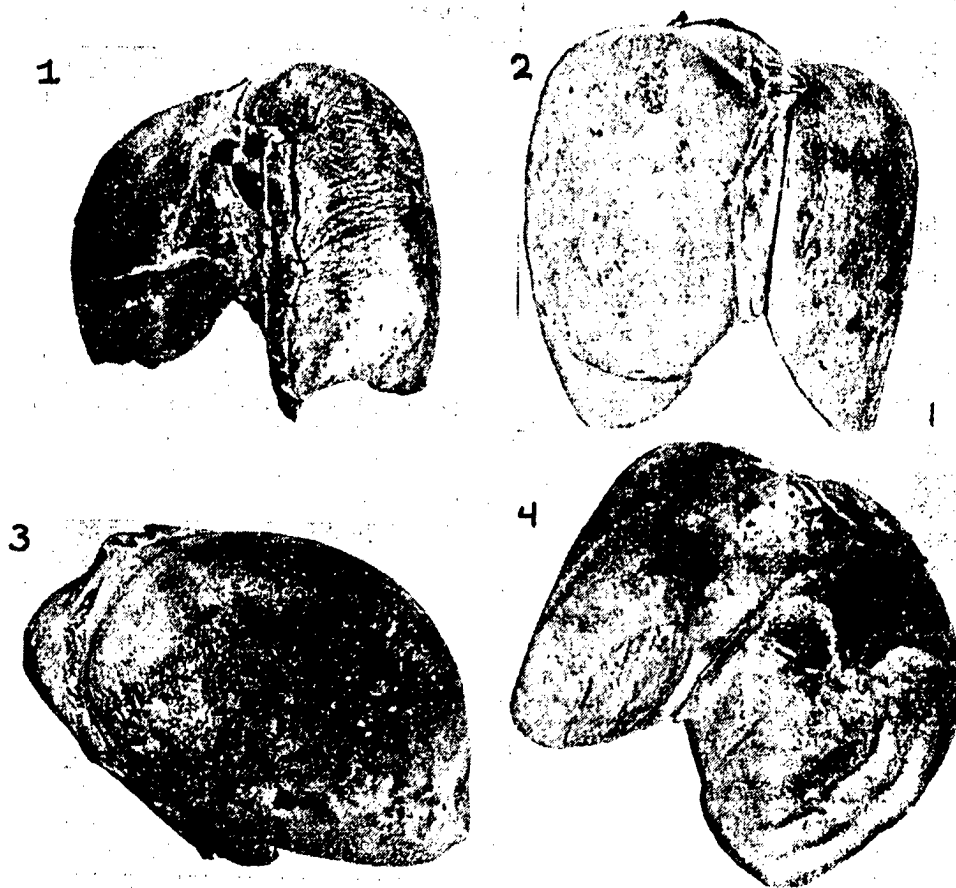


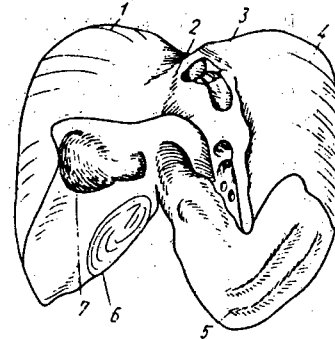
Figure 1. The aphalin liver: 1--view from above; 2--ventral surface (part of the falciform ligament is visible); 3--view from the left; 4--visceral (posterior) surface.

Almost the entire surface of the liver is covered by the peritoneum. The exceptions are the areas where the vessels and nerves enter and exit, and the main area is where the liver is attached to the dorsal wall of the abdominal cavity. The liver's attachment to the dorsal wall, and its enclosure by the dorsal, lateral, and ventral walls of the abdominal cavity help hold the liver in place. The organs in the thoracic cavity, to which the liver is adjacent



cranially via the diaphragm, and the organs in the abdominal cavity that lie adjacent to the liver caudally, also help hold the liver in place. The most stationary section is the part attached to the dorsal wall of the abdominal cavity, the rest of the liver can move about to a certain extent with respect to adjacent organs and tissues depending on the functional condition of these organs and tissues.

Figure 2. Liver, view from above and behind, drawing made from specimen: 1--left lobe; 2--esophageal impression; 3--large vessels passing through longitudinal channel on the dorsal side of the liver; 4--right lobe of the liver; 5--intestinal impression on the right lobe; 6--intestinal impression on the left lobe; 7--impression from the second part of the stomach.



From the data presented here it is evident that some of the information corresponds completely to the data obtained by earlier investigators in their research on other cetaceans. This applies primarily to the bilobal structure of the liver (Jackson, 1845; Berzin, 1971; Green, 1972), the absence of a gall bladder (Jackson, 1845; Jungklaus, 1898; Betesheva, Sergiyenko, 1964; Betesheva, 1965; Berzin, 1971; Green, 1972), the merging of the hepatic and pancreatic ducts in the thick part of the pancreas (Turner, 1889; Betesheva, Sergiyenko, 1964; Betesheva, 1965; Takahashi, Jamasaki, 1972, and others), the nature of the penetration of the combined duct into the intestinal ampulla (Jungklaus, 1898; Yablokov, 1958; Kamija, 1962; Kleynberg, Yablokov, Belkovich, Tarasevich, 1964; Berzin, 1971, and others). In addition we have reported some new data that provide more information both on the details of the structure and the topographical relationship between the liver and adjacent organs and tissues in the Black Sea aphalin dolphin.

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DIVING-INCURRED HEMODYNAMIC CHANGES IN BAIKAL SEAL

Novosibirsk IZVESTIYA SIBIRSKOGO OTDELENIYA AKADEMII NAUK SSSR: SERIYA BIOLOGICHESKIYE NAUKI in Russian No 2, Aug 85 (manuscript received 4 Aug 83) pp 97-102

[Article by T.V. Neshumova, V.A. Cherepanova, I.Sh. Shterental and Ye.A. Petrov, Institute of Cytology and Genetics, Siberian Department, USSR Academy of Sciences, Novosibirsk]

[Abstract] Forced, 10 min, head submersion was employed with the Baikal seal (*Ph(Pusa) sibirica*) to assess the effects on hemodynamics and provide insight into hemodynamic correlates of diving. Immersion in 10°C water was accompanied by immediate cessation of blood flow in subcutaneous fatty tissue and muscles (*m. triceps* and *m. gluteus maximus*) and onset of pronounced bradycardia from a rate of 120 to 11/min within 10 sec. Control levels of heart rate were recovered within 20 sec of immersion, while blood flow through the muscles and the adipose tissue remained depressed for at least 5 min (63 and 38% of control value, respectively). These observations were consonant with the view that during diving the physiological mechanisms preferentially supply the heart and brain with oxygen at the expense of peripheral tissues and organs. In addition, cessation of blood flow through the adipose tissues served to conserve body heat in a cooler environment. Figures 3; references 12: 11 Russian, 1 Western.

12172/13046  
CSO: 1840/319

FIRST STEPS IN STUDYING BELUGA

Moscow PRIRODA in Russian No 1, Jan 86 pp 67-71

[Article by G.N. Ognetrov and O.N. Minibayeva, Polar Scientific Research Institute of Marine Fish Industry and Oceanography imeni N.M. Knipovich, USSR Ministry of Fish Industry, Arkhangelsk]

[Abstract] It is difficult to study sea mammals under natural conditions, especially those living in the arctic sea where the observation time is so short. Only the USA and Canada maintain aquaria in which beluga-type mammals

are kept and may be studied under controlled conditions. An expedition was organized to the Karskoye sea to develop methods to catch and transport beluga to permanent aquaria. Both aspects were successful and details were reported. Sea and air transport of beluga was described. Special nets were developed to catch single specimens and to bring them aboard. In general, the animals tolerated the procedures used well without panic or antagonistic behavior, surviving the capture and transportation without difficulties. Figures 7.

7813/13046  
CSO: 1840/299

UDC 576.895.122:599.745.3

#### PSEUDAMPHISTOMUM TRUNCATUM INFESTATION OF CASPIAN SEALS

Kiev VESTNIK ZOOLOGII in Russian No 2, Mar-Apr 85 (manuscript received 20 Sep 83) pp 51-54

[Article by V.N. Popov, V.A. Korolev and L.A. Skorokhod, Simferopol University imeni M.V. Frunze; Crimea Medical Institute

[Abstract] An epidemiologic and histopathologic study was conducted on the seals (*Pusa caspica*) in the Caspian Sea to determine the extent of infestation with the trematode *Pseudamphistomum truncatum*. Highest levels of infestation, affecting some 93.8% of the animals, were noted in the Volga and Ural river deltas, reflecting favorable conditions for the survival of *P. truncatum*. Lowest incidence of infestation (16.7%) was noted in the southern part of the Caspian Sea in the vicinity of the Ogurchinskiy Island, reflecting migration patterns of the infected individuals. Histopathologic examinations of the liver revealed up to 45 trematodes per 1 cm<sup>3</sup> of liver tissue in the most severely infested seals. Histologic examinations revealed connective-tissue encapsulation of trematode sites, with surrounding macrophage and lymphocyte infiltrate. Within the capsules, eosinophils predominated. The gall bladders were heavily laden with trematode eggs and showed considerable thickening of the walls. Gross examination revealed whitish tumors on the livers ranging from one to several centimeters in diameter. Metabolic consequences of the infestation included the presence of cholesterol crystals in the gall bladder walls and depressed concentrations of lipids and glycogen in the hepatocytes. Figures 2; references 3 (Russian).

12172/13046  
CSO: 1840/1048

## MEDICINE

### COMPUTER USED IN EMERGENCY MEDICAL UNIT

Moscow IZVESTIYA in Russian 25 Dec 85 p 6

[Article by A. Ryabushev, special correspondent of "Izvestiya" in Leningrad with photographs by A. Shirman: "An Electronic Physician's Assistant"]

[Text] Cardiac arrest. "Predicted" three days before by a computer. And this made it possible to save the life of Sasha Romanov.

"No, the computer wasn't in error," says G. Nazarenko, senior scientific associate at the Leningrad Scientific Research Institute for Emergency Medical Care. "On the basis of programs put into it, the computer put out a prognosis of the young man's condition. And once we had obtained these data, we began to look for the best way to save the patient's life."

What exactly happened?

A crash...Sasha Romanov was brought to the Institute for Emergency Medical Care with fractures of the pelvis, extremities and several ribs. At the 74th hour after admission to the clinic the prognosis was confirmed when cardiac arrest occurred.

The physicians used open-heart massage. Dr. Aleksandr Bolshakov massaged Romanov's heart for 45 minutes and, finally, brought him back from a state of clinical death.

For almost half a year, in the Anti-Shock Center of the Institute for Emergency Medical Care, a system of establishing prognoses and methods of treatment for severe traumas, especially complicated shock conditions, has been in operation.

We are sitting in the reanimation unit beside German Igorevich Nazarenko, the manager of the system, and Dmitri Shirokov, junior scientific associate. A few minutes ago, a woman was admitted to the unit with severe arm and chest fractures. Her blood pressure, pulse and temperature are measured with

instruments. These data are put in along with other information into the computer. The machine consultation, the physician's electronic assistant, has begun its work.

Nazarenko says, "The more the on-line information processing and prognosis help the physician to gain time, the more important is it in severe trauma and shock to make an on-line selection of the optimal tactic for therapy. The introduction of the system," he continues, "made it possible to improve the quality of treatment and reduce the number of lethal outcomes."

Physicians and engineers operate the system. For example, Nazarenko himself has two higher degrees. Along with Yuriy Nikolayevich Tsybin, Dr med. sci., head of the reanimation-anesthesiological department, he became one of the originators of the "physician's electronic consultant." Engineers from the All-Union Scientific Research Institute for Medical Laboratory Technology B. Feldman and S. Lenskiy provided help.

9582

CSO: 1840/294

## LASER RESEARCH ON VISION

USSR (T/S) TASS IN RUSSIAN FOR ABROAD 5-35 in English 1707 gmt 4 Dec 85

[Article by Eleonora Sutotskaya, TASS correspondent]

[Text] Soviet Ophthalmologist Svyatoslav Fedorov considers the use of lasers in curing long-sightedness very promising. With their help, it is possible to increase the optical power of the cornea and make sight normal. So far, over 500 such operations have been carried out successfully at the Moscow Institute for Eye Microsurgery which Fedorov heads.

His clinic is renowned for curing glaucoma and cataracts. Crystalline lenses have been used here for more than 25 years. The Moscow silicone crystalline lens, similar to a crystallite transparent petal and possessing great optical properties, is becoming increasingly well known.

The clinic is most renowned for operations to cure short-sightedness. The institute has developed a set of instruments for this operation which involves making several small incisions in the cornea using a diamond knife. A computer calculates the equipment needed and a prognosis individually for every patient. Data collected over 11 years on 17,000 patients, although significantly more have been treated, shows that in not one case has short-sightedness returned.

Now, the operation is carried out by a team of five physicians working on an "assembly line" basis. Each physician quickly carries out his part of the operation, and a team leader monitors the course of surgery. Every three minutes, a patient emerges from the operating theatre with normal sight. Fedorov explains that now they treat almost 100 patients a day, and the quality of the operation has increased with fewer complications arising with the team of five physicians employed.

A new idea of Fedorov is that automated modules for such operations be set up alongside any hospital. Soviet experts and their Yugoslav and Finnish colleagues intend to carry out the manufacturing of such systems next year.

/13046

CSO: 1840/339-E

EXPERIENCE GAINED IN CONDITIONED-REFLEX THERAPY OF ALCOHOLISM WITH SMALL DOSES OF LICOPODIUM SELAGO

Kiev VRACHEBNOYE DELO in Russian No 12, Dec 85 (manuscript received 4 Jun 85)  
pp 71-72

[Article by N.N. Cherednik and K.S. Plyuyko, Department of Psychiatry  
(Chairman prof. P.G. Metsov), Crimean Medical Institute, Simferopol]

[Abstract] To avoid undesirable side effects, the usual dose of lycopodium selago (LS) was lowered. Each patient received 30-50 ml of a 5% LS brew every evening, followed by 50 cc vodka or other liquor. The patients were told to smell the alcohol and to gargle and rinse their mouths with it. Concurrently, suggestions were made directed at defensive reaction to words like wine, vodka, etc. In about 15-30 minutes after taking the LS brew, the patients experienced strong salivation, weakness, sweating, hyperemia, headache, dizziness, and unpleasant feeling in the throat and in the epigastric area. Occasionally, they vomited once. Prolonged somatic or colloptoid states were not observed. After 20-25 such sessions, patients developed persistent aversion to alcohol. After release from the hospital, the patients continued to be treated on an outpatient basis for 5 to 10 more cycles. Twenty-five percent of these patients exhibited remissions lasting more than a year, in comparison with 18% of those in the group treated with apomorphine. Treatment with LS was combined with traditional methods of psychotherapy, work-, biblio-, musical-, and esthetotherapy. These results can be obtained only under strict supervision in a hospital, not by therapy at home.

7813/13046  
CSO: 1840/326

CORTICOSTEROID AND CORTICOTROPINE LEVELS IN PATIENTS WITH HYPOCORTICISM BEFORE AND AFTER TRANSPLANTATION OF ADRENAL CORTEX CELL CULTURES

Kiev VRACHEBNOYE DELO in Russian No 12, Dec 85 (manuscript received 4 May 85)  
pp 77-79

[Article by I.V. Komissarenko, N.D. Tronko, A.K. Cheban, I.S. Turchin, Kim Dzhon Sam, T.P. Bezverkhaya, S.I. Rybakov, R.M. Shichinava, V.V. Markov, Ye.V. Luchitskiy, A.A. Yakovlev, D.S. Onishchenko, A.V. Tishchenko and A.G. Lysenko, Kiev Scientific Research Institute of Endocrinology and Metabolism]

[Abstract] Results are reported of tissue culture transplantation (from human and suckling piglet sources of adrenal cortex) to patients with various forms of hypocorticism (Addison disease, bilateral adrenalectomy, effects of prolonged administration of synthetic steroids for bronchial asthma, etc).



In all, 41 patients were studied: 34 women and 7 men aged 12-50 years. All of them were on replacement steroid therapy. The results were gratifying: general condition of the patients improved, dyspeptic phenomena disappeared, blood pressure returned to normal. The levels of ACTH (blood) and 17-corticosteroids and 17-ketosteroids (urine) became normalized. Thus, it was shown that allo- and xenotransplantation of adrenal cortex tissue culture is an effective method for controlling hypocorticism by preserving or reconstituting secretory activity in the body of the recipient. References 4 (Russian).

7813/13046  
CSO: 1840/326

UDC 61.65.012.45:65.011.56

#### AUTOMATION OF SYSTEM FOR MANAGING MEDICAL INFORMATION

Leningrad VOPROSY ONKOLOGII in Russian Vol 31, No 9, Sep 85 (manuscript received 5 Feb 85) pp 85-87

[Article by V.N. Gerasimenko, M.V. Semenovich, N.A. Tikhonova and A.Ye. Zolotarev, All-Union Oncological Scientific Center, USSR Academy of Medical Sciences, Moscow]

[Abstract] At the All-Union Oncological Center of the USSR Academy of Medical Sciences, principles for using computers to search the material in hospital medical archives are being developed. The initial data base, involving case histories, was prepared with punched cards on an M-222 computer. The current system employs an EC-1010 computer and interactive video-display terminals. The data base includes case histories of all patients hospitalized at Center hospitals since 1975, with some data beginning in 1952. Information includes passport data, reasons for hospitalization, treatment details, and scope of investigation. The data input dialog displays the possible answers to the various questions which must be answered by the user, with the aid of coding dictionaries. The system also includes a correction routine and automatic control of data quality. Data output can be patient-specific information, groupings of data using such factors as time interval and diagnosis, correlation tables, and special reports on hospital activity.

12126/13046  
CSO: 1840/220

MICROBIOLOGY

UDC 576.8.095.35

STUDIES ON KILLER YEASTS

Riga IZVESTIYA AKADEMII NAUK LATVIYSKOY SSR in Russian No 11, Nov 85  
(manuscript received 31 May 85) pp 67-71

[Article by D.Ya. Karklinya and A.Ya. Liyelpetere, Institute of Microbiology imeni Avgust Kirkhenshteyn, Latvian SSR Academy of Sciences]

[Abstract] Currently available literature on the killer yeasts is briefly reviewed, with emphasis on some of the more important findings. Basically, the toxin produced by the killer yeasts is a glycoprotein with a protein: carbohydrate ratio of 1:3. It is an unstable toxin that rapidly loses activity at room temperature and at pH other than 4.7. The toxin is a 1-2 megadalton molecule, with the active portion of the molecule ( $\alpha + \beta$ ) accounting for 10-30% of its MW. The mechanism of action on susceptible yeasts involves initial binding to a (1-6)- $\beta$ -D-glucane receptor via the  $\beta$  portion, and subsequent damage to the cytoplasmic membrane by the  $\alpha$  part, leading to leakage of  $K^+$  and ATP and eventual cell death. Analysis of fermentation products produced by *S. vini* killer showed no significant differences from the products obtained with  $K^-$  and neutral *S. vini* cells. Figures 2; references 26: 9 Russian, 17 Western.

12172/13046  
CSO: 1840/327

UDC 620.193:628.147

BIOLOGICAL FACTORS IN CORROSION OF HOT WATER SUPPLY PIPES IN RIGA

Riga IZVESTIYA AKADEMII NAUK LATVIYSKOY SSR in Russian No 11, Nov 85  
(manuscript received 27 Dec 84) pp 117-123

[Article by E.A. Linde, T.E. Sturis, Yu.N. Sokolov, V.A. Trushinska, Yu.O. Yakobson and V.M. Kadek, Institute of Microbiology imeni Avgust Kirkhenshteyn and Institute of Inorganic Chemistry, Latvian SSR Academy of Sciences]

[Abstract] A study was conducted to determine the potential contribution of microbial factors to corrosion of steel pipes used for hot water supply in

Riga. A variety of laboratory techniques resulted in the identification of a thermophilic *Desulfovibrio* sp. and several iron bacteria species (*Galionella*, *Leptothrix*, *Crenothrix*). All the species were present in low numbers and the counts varied with the season, far below the levels detected in the sixties. Bacteriological characteristics of the isolates are presented, with the notation that their presence in the water supply may accelerate corrosion through sulfate reduction and iron utilization. Figures 1; references 20: 17 Russian, 3 Western.

12172/13046

CSO: 1840/327

UDC 575.1:576.851.48

PLASMID STABILITY IN BACTERIAL CELLS

Novosibirsk IZVESTIYA SIBIRSKOGO OTDELENIYA AKADEMII NAUK SSSR: SERIYA BIOLOGICHESKIYE NAUKI in Russian No 2, Aug 85 (manuscript received 16 Jul 84) pp 106-110

[Article by V.Ye. Repin, I.A. Potapova and S.N. Shchelkunov, All-Union Scientific Research Institute of Molecular Biology, Koltsovo]

[Abstract] An analysis was conducted on stability of vector plasmids pBR322 and pBR327 in *E. coli* CSH54 on solid L medium in the course of multiple transfers. In addition, determinations were also made of plasmid resistance to elimination by acridine orange. The resultant data demonstrated that pBR327 was far more stable in the *E. coli* cells than pBR322 over some 210 generations. Similar studies were obtained with acridine orange treatment, which showed that the cure rate for cells bearing pBR327 was far lower than for cells carrying pBR322. These observations indicate that some fundamental bacterial mechanisms are implicated in maintenance of pBR327, as well as the fact that pBR327 should be selected as the preferred vector for cloning foreign genes in *E. coli* CSH54. Figures 1; references 15: 4 Russian, 11 Western.

12172/13046  
CSO: 1840/319

UDC 582.282.23:579.254.2

PREPARATION OF SACCHAROMYCES CEREVISIAE PROTOPLASTS FOR TRANSFORMATION WITH PLASMID DNA

Novosibirsk IZVESTIYA SIBIRSKOGO OTDELENIYA AKADEMII NAUK SSSR: SERIYA BIOLOGICHESKIYE NAUKI in Russian No 2, Aug 85 (manuscript received 2 Apr 84) pp 135-140

[Article by L.G. Tyryshkin, V.Ye. Repin, V.G. Pugachev and S.N. Shchelkunov, All-Union Scientific Research Institute of Molecular Biology, Koltsovo]

[Abstract] Studies were conducted on the most efficient method for the preparation of protoplasts from *Saccharomyces cerevisiae* yeasts, in order to

facilitate transformation with plasmid DNA for use in genetic engineering. Trials with the digestive juice of the edible snail, drozhzhelitin GlOx ('yeast lytin'), and beta-glucuronidase demonstrated that drozhzhelitin was the most efficient enzymatic preparation in the production of protoplasts that also showed the greatest potential for cell wall regeneration. Optimal protoplast protection was obtained with 1 M sorbitol. Highest protoplast concentrations were obtained with yeast cells obtained from the early phase of logarithmic growth, reaching levels of  $(2-6) \times 10^7$  protoplasts/ml. Transformation of *S. cerevisiae* YNN27 protoplasts with plasmid YR27 DNA yielded transformation frequencies  $((1.5-2.5) \times 10^{-3})$  that were on an order of magnitude greater than those obtained with protoplasts produced by beta-glucuronidase or the digestive juice. Figures 2; references 17: 4 Russian, 13 Western.

12172/13046  
CSO: 1840/319

UDC 577.113.5+577.3.32

# CLONING OF cDNA OF BOVINE PRO-OPIOMELANOCORTIN mRNA AND DETERMINATION OF ITS PRIMARY STRUCTURE

Novosibirsk IZVESTIYA SIBIRSKOGO OTDELENIYA AKADEMII NAUK SSSR: SERIYA BIOLOGICHESKIYE NAUKI in Russian No 2, Aug 85 (manuscript received 14 Mar 85) pp 140-143

[Article by S.Ya. Golovin, L.V. Mamayev, A.B. Beklemishev, V.A. Karginov, I.V. Frolov, A.A. Kolykhalov, V.A. Petrenko, N.P. Mertvetsov, I.V. Morozov, G.F. Sivolobova and Yu.A. Pankov, All-Union Scientific Research Institute of Molecular Biology, Koltsovo; Novosibirsk Institute of Bioorganic Chemistry, Siberian Department, USSR Academy of Sciences; Institute of Experimental Endocrinology and Hormone Chemistry, USSR Academy of Medical Sciences, Moscow]

[Abstract] Poly-A-containing mRNA from the pars intermedia of the bovine pituitary was used for the synthesis of the corresponding cDNA, with the double-stranded cDNA inserted into plasmid pBR327 at site Pst I for transformation of *E. coli* IC-5183. *E. coli* clones with plasmids containing DNA inserts complementary to the mRNA of pro-opiomelanocortin were identified by hybridization of the clonal DNA in situ with P-32 labeled synthetic 5'-TTC ATG ACC TCCGA-3' corresponding to the endorphin region of bovine pro-opiomelanocortin mRNA. The size of the cDNA inserts in the plasmids of the analyzed clones ranged from 200 to 600 nucleotide pairs, and showed ca. 65-92% homology with the beta-endorphin coding region of pro-opiomelanocortin cDNA derived from four other species, including man. Figures 2; references 11: 3 Russian, 8 Western.

12172/13046  
CSO: 1840/319

NIEMR of the USSR Academy of Sciences and the USSR Ministry of Health. The results of the study are presented in the form of a monograph. The monograph is written in Russian and contains 100 pages. The monograph is written in Russian and contains 100 pages. The monograph is written in Russian and contains 100 pages. UDC 951.147.8:097.39:615.847.8

#### THYMUS MODULATION OF MAGNETIC FIELD EFFECTS ON ANTIBODY SYNTHESIS

Kiev FIZIOLOGICHESKIY ZHURNAL in Russian No 1, Jan-Feb 85 (manuscript received 14 Jan 83) pp 71-73

[Article by E.V. Gyulling, O.F. Melnikov, V.N. Pisanko and E.M. Olishchevskiy, Kiev Institute of Otolaryngology]

[Abstra] Thymus-dependent SRBC antigen was employed to test the involvement of the thymic gland in modulation of the effects of magnetic fields on antibody response in WAG rats. Intact and thymectomized rats were exposed to a single or triple (at one-day interval) course of variable magnetic field (50 Hz, 10 mT) treatment, followed by intraperitoneal injection of the SRBC and monitoring of splenic antibody-forming cells and serum hemagglutinin levels. Single exposure to the variable magnetic field resulted in marked elevation of splenic antibody-forming cells and in serum hemagglutinin levels in intact control rats, whereas both parameters were depressed in magnetic field-treated and untreated thymectomized rats. A course of three exposures to the magnetic field led to depression of splenic antibody-forming cells and hemagglutinin levels in thymectomized and nonthymectomized animals. These findings demonstrate that magnetic field effects on antibody synthesis are mediated via the thymus, and that the effect consists of enhanced migration of thymocytes to the peripheral lymphoid tissues. References 9: 7 Russian, 2 Western.

12172/13046

CSO: 1840/1058

UDC 591.044.2:591.111

#### ALTERNATING ELECTRIC FIELD-INDUCED CHANGES IN MORPHOLOGICAL FEATURES OF MOUSE BLOOD IN RELATION TO AGE

Kiev FIZIOLOGICHESKIY ZHURNAL in Russian No 1, Jan-Feb 85 (manuscript received 5 Oct 82) pp 73-76

[Article by A.K. Baskuryan and A.G. Kartashev, Institute of Biology and Biophysics, Tomsk University]

[Abstract] Outbred white mice were employed in a study on the effects of alternating electric fields (50 Hz, 40 ± 5 kV/m) on blood morphology in

relation to age. Exposure of 15-60-day old mice for 5 days resulted in marked anemia and reticulocytosis. With a 10-day exposure, erythrocyte counts fell by 30%; after 20 days of exposure, recovery of the red elements was evident in conjunction with leucocytosis. After 40 days of exposure, the blood counts were essentially normal. Exposure of adult (60-100 days) mice resulted in leucopenia, that disappeared after 10 days of exposure, with further exposure for 20-40 days accompanied by basically normal counts. Aged mice (240-260 days) were entirely refractory to the effects of the alternating electric field. These findings indicate that juvenile mice are most susceptible to the physical agent in question, but that the changes are temporary and apparently reflect adaptive changes in the erythropoietic system. References 1 (Russian).

12172/13046

CSO: 1840/1058

UDC 616.831-005.1-036.8-085.849.112-036.8-07:616.74-073.97

# ELECTROMYOGRAPHIC ASSESSMENT OF DECIWAVE TREATMENT OF STROKE PATIENTS

Moscow VOPROSY KURORTOLOGII, FIZIOTERAPII I LECHEBNOY FIZICHESKOY KULTURY in Russian No 6, Jun 85 (manuscript received 15 Jul 85) pp 29-33

[Article by A.V. Musayev, Central Scientific Research Institute of Health Resorts and Physical Therapy, Moscow

[Abstract] Therapeutic trials were conducted on 68 stroke victims between the ages of 34 and 70 years, to assess deciwave therapy in terms of electromyographic indicators. Group I patients received irradiation to the site of ischemic insult (20-30 W, 10-15 daily 10-15 min treatments), with 48% of the subjects showing marked symptomatic and objective improvements. Group II patients were irradiated in the cervicoportal projection, with 45% showing a similar degree of improvement after the course of treatment. Electromyographic studies on the ulnar, tibial, and peroneal nerves showed that deciwave therapy resulted in an increase in motor conduction, an increase in the amplitude of the M wave, and an increase in the number of functional motor units in the hand and the foot. The improvements were more remarkable in the case of the hand nerves. These findings demonstrate that deciwave treatment enhanced homo- and contra-lateral pyramidal conduction, and in activation of previously silent motor units. References 5 (Russian).

12172/13046

CSO: 1840/1057

EFFECTS OF DECIMETER WAVE THERAPY ON EEG IN CONVALESCENTS AFTER RECONSTRUCTIVE CEREBROVASCULAR SURGERY

Moscow VOPROSY KURORTOLOGII, FIZIOTERAPII I LECHEBNOY FIZICHESKOY KULTURY  
in Russian No 6, Jun 85 (manuscript received 6 Dec 84) pp 33-37

[Article by V.M. Andreyeva and D.P. Danilova, Central Scientific Research  
Institute of Health Resorts and Physical Therapy, Moscow]

[Abstract] An analysis was conducted on the effects of deciwave treatment (20-40 W output, 10-15 min/day for 10-12 sessions) in the cervicoportal projection on EEG in convalescents from reconstructive cerebrovascular surgery. The cohort consisted of 39 male and female patients 18 to 59 years of age. Early treatment--3-6 weeks after surgery--showed pronounced improvement in the EEG patterns in 71.4% of the patients, consisting in reduction of diffuse and localized pattern abnormalities, that persisted for over a year. A similar degree of improvement was obtained in patients treated a year after surgery in 63.6% of the cases. These observations substantiate the therapeutic effectiveness of deciwave treatment following reconstructive cerebrovascular surgery, with the further indication that optimal results are obtained with early implementation of this modality. Figures 2; references 7 (Russian).

12172/13046  
CSO: 1840/1057

VARIABLE EFFECTS OF PERMANENT MAGNETIC FIELDS ON CELL PROLIFERATION IN MOUSE CORNEA

Moscow VOPROSY KURORTOLOGII, FIZIOTERAPII I LECHEBNOY FIZICHESKOY KULTURY  
in Russian No 6, Jun 85 (manuscript received 29 Sep 85) pp 45-48

[Article by G.V. Galaktionova]

[Abstract] An analysis was conducted on the effects of intermittent short- and long-term exposure to permanent magnetic fields (PMF) on cellular proliferation, using the mouse cornea as a model system. Long-term exposure to 1.6 T PMF (3 h/day for up to 30 days) induced a fluctuating pattern of changes in the mitotic index (MI), whereas short-term exposures to 0.4, 0.8, and 1.6 T PMF (15-30 min) induced rapidly reversible inhibitions of MI. Background levels of MI prevailed 10 days after discontinuation of exposure to PMF. In general, there was no unequivocal correlation between induction and duration of exposure on the MI. In addition, PMF did not affect the rate of cell death nor induce chromosomal aberrations. References 6: 5 Russian, 1 Western.

12172/13046  
CSO: 1840/1057



MICROCURRENT STIMULATION OF CUTANEOUS WOUND HEALING

Moscow VOPROSY KURORTOLOGII, FIZIOTERAPII I LECHEBNOY FIZICHESKOY KULTURY  
in Russian No 6, Jun 85 (manuscript received 12 Dec 84) pp 63-65

[Article by Ye.P. Razvozova and L.N. Sinitsyn, Gorky Scientific Research  
Institute of Traumatology and Orthopedics, RSFSR Ministry of Health]

[Abstract] Trials were conducted with 72 patients ranging in age from 5 to 70 years to assess the effects of superficially applied microcurrents on the healing of skin wounds. The clinical spectrum covered persistent wounds from less than 2 months to more than a year in duration, representing insults resulting from burns, trauma, and gunshots. Testing of the various current modalities showed that negative polarity 2-3  $\mu\text{A}/\text{cm}^2$  currents induced the greatest degree of regeneration. Effects became evident within a day or two. However, after 4 days, the degree of regeneration slowed down. These observations point to the positive role that weak direct currents can exert on wound healing when applied for 2 to 20 days, a therapeutic modality that has been shown to be effective in the management of wounds refractory to other forms of treatment.

12172/13046

CSO: 1840/1057

PHARMACOLOGY AND TOXICOLOGY

UDC 615.31.1-015:546.23

PHARMACOLOGY OF SELENIUM-CONTAINING COMPOUND

Baku DOKLADY AKADEMII NAUK AZERBAYDZHANSKOY SSR in Russian Vol 41, No 9,  
Sep 85 (manuscript received 12 Dec 84) pp 83-86

[Article by R.A. Abdullayev, D.Ya. Guseynov, R.A. Babakhanov and Kh.M. Mirzoyev,  
Azerbaijan Medical Institute imeni N. Narimanov]

[Abstract] Selenium-containing compounds are used in increasing frequency in medicine; they affect biological indices of the human body showing anti-histamine and antioxidative activity; they can cause acute intoxication, promote tumor development in liver, and help regulate the functions of the retina. A selenium compound (I) was investigated in depth; it was synthesized at the Sumgait branch of the Institute of petrochemical processes. I was a colorless, crystalline powder soluble in water, with molecular weight 341.5 and elemental composition  $C_{13}H_{25}SeNO_2$  (approximate). On the basis of experimental data, its  $LD_{50}$  on s.c. administration to white mice was 600 mg/kg. I.v. injections of I in doses of 25-50 mg/kg showed no significant effect on the heart activity. A 75 mg/kg dose was fatal within 1-2 minutes after an i.v. administration. I.V. injection to cats at a dose of 50 mg/kg resulted in a transient drop of the arterial pressure which returned to normal after 5-10 min. The respiration rate and its amplitude decreased and returned gradually to normal level after 20-30 minutes. Figures 2; references 18 (Russian).

7813/13046  
CSO: 1840/302

UDC 581.6:581.19:58.08

SCREENING FOR ANTIOXIDANTS IN PLANT EXTRACTS

Leningrad RASTITELNYYE RESURSY in Russian Vol 21, No 2, Apr-Jun 85  
(manuscript received 1 May 84) pp 216-220

[Article by O.B. Maksimov, N.M. Rebachuk and L.V. Boguslavskaya, Pacific Ocean Institute of Bioorganic Chemistry, Far Eastern Scientific Center, USSR Academy of Sciences, Vladivostok]

[Abstract] A TLC method has been developed for the rapid screening and detection of antioxidant activity in plant extracts and other complex mixtures.

The basic approach consists of TLC resolution on silica gel plates of the mixture being screened, spraying with linetol (ethyl esters of oleic, linoleic, and linolenic acids), and incubation at 60-70°C for a short period of time. Oxidation of linetol resulted in the formation of peroxide compounds, which can be detected by spraying with developing compounds. Spots on the chromatograms with antioxidants inhibited the formation of peroxides, leading to their visualization. References 18: 7 Russian, 11 Western.

12172/13046

CSO: 1840/1063

UDC 612.13

#### EFFECTS OF CHOLINESTERASE INHIBITORS ON VASCULAR PERMEABILITY IN RABBIT EYE

Leningrad FIZIOLOGICHESKIY ZHURNAL SSSR in Russian Vol 81, No 6, Jun 85

(manuscript received 10 May 83) pp 792-795

[Article by A.A. Pshenichnova, No 7 City Ophthalmological Hospital, Leningrad]

[Abstract] Several cholinesterase inhibitors were tested for their effects on vascular permeability in the eye, using rabbits as the test animals. Following intravenous injection of fluorescein, solutions of armin (0.022%), proserine (0.025%), or phosphacol (0.002%) were introduced into the conjunctival sac after an appropriate period of time. In each case, fluorescence of the experimental eye increased from a background level of 20 arbitrary units to 44-45 units. After 2 h, fluorescence of the experimental eye decreased to below the control-eye level. Figures 1; references 11: 9 Russian, 2 Western.

12172/13046

CSO: 1840/1040

UDC 581.6:582.232:632.7

#### INFLUENCE OF TOXINS OF BLUE-GREEN ALGAE ON HOUSEFLY LARVAE AND GYPSY MOTH CATERPILLARS

Leningrad RASTITELNYYE RESURSY in Russian Vol 21, No 4, Oct-Dec 85

(manuscript received 9 Oct 84) pp 486-489

[Article by V.V. Semakov, Pamir Biological Institute, TaSSR Academy of Sciences, Khorog]

[Abstract] This paper describes the effects of toxins from seven types of blue-green algae: Synechocystis Racib, Anabaena autumnalis Kuetz, Merisneopodia Dean, Nostoc muscorum Kuetz, Nostoc Vauch, Anabaena variabilis Kuetz, and Microcystis aeruginosa Kuetz. Housefly larvae (Musca domestica)

had liquid from the algae cultures added to their food and were held for 7 days at 23°C. Then the number of live specimens and the number evolved to pupae were counted. Most of the algae had an inhibiting effect on the larvae. Those which had not developed to pupae at the end of 7 days generally did so later, but their weight was less than half that of the controls, and they were apparently sexually immature. Gypsy moth (*Ocneria dispar*) caterpillars had biomass from five of the types of blue-green algae added to their food; the number of caterpillars still alive was then counted at two-day intervals. All these groups had 100% mortality within 5-7 days; several were within three days. On both insects tested, the most dramatic effects were from *Nostoc muscorum*; one strain killed 100% of the housefly larvae within the 7-day time period, while another strain killed 100% of the caterpillars the first day. References 22: 12 Russian, 10 Western.

12672/13046

CSO: 1840/1039

## PHYSIOLOGY

### DEVELOPMENT OF LARGE HYPERBARIC COMPLEX AT LENINGRAD

Moscow IZVESTIYA in Russian 30 Dec 85 p 6

[Article by special IZVESTIYA correspondent A. Blokhnin, Leningrad: "Nick Goes Into the Depths"]

[Text] Before bolting the hatch of the pressure chamber, an apple was given to the unusual aquanaut. And he, as if understanding that this was the opportunity to eat to his heart's content before a long and complicated experiment, began to slowly nibble off the apple piece by piece. Then the laboratory workers, without waiting for the end of the meal, secured the special seat of transparent plexiglas to the center of the pressure chamber. In the room amplified with a loudspeaker could be heard the command "Begin compression!"

Thus, State acceptance trials of a unique complex, developed for fundamental research on animals in superdeep water dives, were begun at the Laboratory of Hyperbaric Physiology, Institute of Evolutionary Physiology and Biochemistry imeni I. M. Sechenov, USSR Academy of Sciences. Only the French and Americans had similar apparatus before us.

Before Nick--a bright Javanian macaque, who is a "meritorious aquanaut" of the laboratory--began his first deepwater descent at KIZh [Research Chamber for Animal Experiments], the chamber underwent careful simulation tests. Alcohol ignited in the main compartment of the complex yielded the required amount of carbon dioxide, of which the life support system purified the breathing mixture. Now Nick was supposed to check everything.

In the center of the main room of the hyperbaric complex is a long steel cylinder about the size of a man, carefully wrapped with a coat of heat-insulating materials. The portholes of thick quartz glass permit one to see everything that occurs inside the pressure chamber. There are 9 cubic meters of space where conditions almost impossible for man to live and work predominate, which nevertheless permit man to be comfortable. To be comfortable, in order to be the host deep under the sea, which will become a supplier of oil and gas, food and mineral raw materials on ever greater scales.

Soviet conquerers of hydrospace have already surpassed the 450-meter depth barrier. But each step to the lower "floors" of the ocean depths is connected to such hazards and unknowns that one cannot get along without animal research. The Research Chamber for Animal Experiments was designed for these very purposes.

The room of the pressure complex, quiet yesterday, is now filled with sounds. The compressors tap dully behind the wall and the gas purification and drying apparatus snuffles easily in the equipment room. Slide valves kiss and automatically controlled motors are switched on and off. All the hardware now operates so as to maintain precisely the computer-calculated conditions of deep-water descent.

Nick has already "dived" twice to 350 meters. True, these dives occurred in pressure chambers that had considerably fewer research capabilities. The Research Chamber for Animal Experiments, compared to them, is an entire underwater vessel. A place has also been found here for the steel "arms" of a manipulator. Nick still looks at their steel joints with some trepidation, although he has been specially trained to them during preparation for the experiment. It is not excluded that the manipulator will be required not only to deliver food from a lock to the galley, but also to assist the "aquanaut."

"Adaptation to an artificial gas environment," says the laboratory director Doctor of Biological Sciences, Professor I. Demchenko, "will permit man to maintain efficiency at great depths. Even the most modern rigid diving suit 'paralyzes' movements at a depth of approximately 150 meters and human strength is simply incapable of bending or unbending the arm, without mentioning any productive work. But how is one to learn and work at 40-50 atmospheres, which corresponds to depths of 400-500 meters?"

And we must go even deeper. The breathing mixture (a trimix), consisting mainly of helium with small quantities of nitrogen and oxygen, has properties at these pressures which the human organism has not yet encountered. The density of the trimix approaches the density of a liquid--hence, the improbable loads on the respiratory organs. Its thermal conductivity (seven times higher than that of air) converts the temperature factor to an injurious factor. It is an impossible task to brew tea at great depth: boiling water poured into a glass cools instantly. It is no wonder that aquanauts who have completed record dives at the Gelendzhik Hyperbaric Complex first requested hot soup after returning to the surface.

The director of a group of morphologists, Candidate of Medical Sciences V. Kostkin, sketches graphs of a comfortable temperature on the board (you read it as one that supports the viability of the organism). The greater the depth, the narrower the framework of thermal comfort. For guinea pigs, for example, it is between +32 and 34.5°C at a depth of 350 meters. Deviation by even one degree in high compression conditions results in death due to supercooling or severe overheating.

Man is no exception. Experimenters have already encountered situations when one test subject is unbearably hot, dressed in a singlet, while another alongside is freezing in a sheepskin coat. Incidentally, clothing in a helium environment that penetrates everything hardly helps.

According to which features were divers accepted before? Strapping and strong. It turns out that not even these qualities are primarily important for deep-water aquanauts. The capability of tolerating hypoxia, the resistance of the immune system and the activity of other protective forces of the organism are more important.

When they showed me the vivarium where the monkeys are maintained, I noted that only male names--Bob, Phil, Ed--were on the cages of the Sukhumi charges. Is this a random coincidence?

"No, it is the result of experiments," they explained to me, "working with the animals, we ascertained that only males are suitable for deepwater dives. Reserved 'males' are required here. 'Females,' finding themselves in an extreme situation, frequently give way to panic, sometimes negating the results of the experiment."

And there is one other problem--leadership. Conducting group experiments, scientists noted that the leader on the surface does not always remain so at depth. Is this really unimportant when selecting the crew of deepwater divers? The Research Chamber for Animal Experiments is opening up exclusively broad capabilities in this aspect. Its equipment permits one to transfer one of the animals to the evacuation compartment with the manipulator if necessary, whereas the experiment will be continued for the other animals.

We saw Nick in the porthole of the pressure chamber for the last time, when the pointer of the pressure gauge approached the 40-atmosphere mark. The director of the automation group S. Cheremenin diverted the monkey, playing with him with the steel arms of the robot. Nick tried to catch the steel palm with a small clawed hand. Despite the constraining movement of the plastic seat, he was successful in most cases.

The frisky "aquanaut" must still remain in the steel home for many days. Just so--aquanauts will also be under pressure for many days and weeks. People are being trained for serious work under water. The brief excursion deepwater dives will be replaced by watches in Neptune's kingdom, which will last for a month or more: it is unphysiological and uneconomical to lower and raise aquanauts from depth frequently.

The day before publication of the article, we received a communication from Leningrad: the experiment had been completed successfully. The heavy hatch of the pressure chamber was opened and Nick was finally freed from the confines of the "aquanaut" chair, which had become boring for many days. All the laboratory workers gathered to meet the monkey, who had returned from the "marine abyss." Someone found an apple. Nick ate it, carefully holding the fruit with his small paws, and seemed to wink at the people.

6521

CSO: 1840/295

UDC 591.127+591.111+616-001.8.001.6:535.379

INDUCED CHEMILUMINESCENCE OF PULMONARY SURFACTANTS AND SERUM

Kiev FIZIOLOGICHESKIY ZHURNAL in Russian No 1, Jan-Feb 85 (manuscript received 9 Mar 83) pp 79-82

[Article by B.Yu. Samelyuk, I.I. Mashchakevich and I.V. Mazepa, Ivano-Frankovsk Medical Institute]

[Abstract] Outbred rats were employed in a study to assess the effects of hypoxic hypoxia on free radical oxidation of pulmonary surfactants and serum lipids, using Fe(II) and hydrogen peroxide induced chemiluminescence to monitor oxidative changes. The chemiluminescent data demonstrated that Fe(II) was more efficient in inducing chemiluminescence in the case of the serum lipids than with extracts and washings containing lung surfactants, but that the reverse was true of hydrogen peroxide. The effects of hypoxic hypoxia were to reduce the level of oxidation of the surfactant and the serum lipids, which was particularly pronounced in the case of the surfactant. These observations indicate that the surfactant system of the lungs is highly susceptible to low oxygen tensions. Figures 2; references 6: 5 Russian, 1 Western.

12172/13046  
CSO: 1840/1058

UDC 612.822.3+612.826

SUMMARY SYNCHRONIZED RESPONSES OF INFERIOR COLLICULI IN LATERALIZATION OF COMPLEX AUDITORY STIMULI

Leningrad FIZIOLOGICHESKIY ZHURNAL SSSR in Russian Vol 81, No 6, Jun 85 (manuscript received 13 Mar 84) pp 706-713

[Article by Ye.A. Radionova, Laboratory of Auditory Physiology, Institute of Physiology imeni I.P. Pavlov, USSR Academy of Sciences, Leningrad]

[Abstract] Electrophysiological studies were conducted on summary synchronized responses of the inferior colliculi of cats subjected to complex harmonic and nonharmonic auditory stimuli that demonstrated that synchronization was dependent on the phasic and spectral characteristics of the stimuli.



Differences in the relationships between the detected changes in the synchronized response and the differences in interaural stimulation were ascribed to the differences in the waveforms acting on the right and left ear and, thereby, to differences in convergence of monaural afferent impulses. Follow-up studies on the localization of complex auditory signals should concentrate on an analysis on the form of auditory oscillations in both ears and the related temporary configuration of converging afferent impulsation. Figures 5; references 16: 9 Russian, 7 Western.

12172/13046

CSO: 1840/1040

UDC 612.858.7

#### CHARACTERISTICS OF NEURON REACTIONS OF SUPERIOR OLIVARY COMPLEX IN RATS TO AMPLITUDE MODULATED STIMULI

Leningrad VESTNIK LENINGRADSKOGO UNIVERSITETA: BIOLOGIYA in Russian No 4, Nov 85 (manuscript received 1 Jun 84) pp 35-42

[Article by A.G. Vasilyev, V.Yu. Plotnikov and T.I. Grigoryeva]

[Abstract] An attempt was made to explain the responses in superior olivary complex (SOC) of rats to amplitude modulated (AM) stimuli. In all, 111 neurons of SOC were studied. The frequency of AM stimulus was expressed in the frequency of neuron ensemble discharge because there was a linear relationship between them. The correlates provided for invariant perception of various stimuli and continuation of perception during presentation of stimuli. They were found to be necessary for central coding in sensory systems. AM stimuli with a frequency of 70-1200 Hz are reflected on the level of SOC: the frequency of individual neuron discharge corresponded to the modulation frequency, the packing frequency was determined by the position of frequency channel; level of intensity and depth of modulation related to the number of synchronously excited neurons of a given level of audio system and duration of the stimulation corresponded to the duration of synchronization reaction. Figures 4; references 10: 8 Russian, 2 Western.

7813/13046

CSO: 1840/318

#### NORADRENALINE AGAINST STRESS

Moscow PRIRODA in Russian No 1, Jan 86 pp 86-91

[Article by V.S. Rotenberg, doctor of medical sciences, senior scientific associate, Laboratory of Psychophysiology and Psychodiagnosis, First Moscow Medical Institute]

[Abstract] Seely proposed a hypothesis relating reactions occurring in organisms to dynamic activity of hypothalamo-hypophyseal-adrenal system. An

attempt was made to illustrate this with important biochemical components of the brain--the monoamines under different states of alertness and sleep. Under normal conditions, the levels of monoamines in brain are maintained by a reverse negative relationship, i.e., with an emotional stress, noradrenaline metabolism is intensified and its circulation is increased. However, in special cases corrections to this are made by the organism: in some stress conditions the level of adrenaline is increased, in others it drops. The question of noradrenaline's role in depressions is open, the newer data challenging old established concepts. The metabolism of noradrenaline in relationship to sleep is also unclear as of now, contradictory data being constantly reported. These apparent contradictions were discussed from the point of "searching activity" concept attempting to unify various observations. Under this term, the author understands behavior directed at altering an unpleasant situation or preserving a pleasant one. In animals it may be expressed by aggressive, submissive, or evasive behavior. This concept brings together a series of problems which in the past were analyzed separately: metabolism of brain catecholamines under different behavioral patterns: in sleep, under stress, and during development of pathological states.

7813/13046

CSO: 1840/299

UDC 612.85

# NEURON ACTIVITY OF CAT INFERIOR COLLICULUS UNDER CONDITIONS OF COMPLEX SOUND LATERALIZATION

Leningrad FIZIOLOGICHESKIY ZHURNAL SSSR in Russian Vol 81, No 5, May 85  
(manuscript received 2 Nov 83) pp 654-656

[Article by Ye.A. Radionova, Laboratory of the Physiology of Hearing, Institute of Physiology imeni I.P. Pavlov, USSR Academy of Sciences, Leningrad]

[Abstract] This paper describes electrophysiological tests of the lateralization of complex sounds by using tungsten electrodes to register individual neurons of the inferior colliculus of test animals anesthetized with a chloralose-nembutal mixture. Tests were conducted with binaural sound stimulation in the range 20-20,000 Hz. Single-tone and complex two-tone signals with a duration of 40 ms and intensities up to 80 dB above a level of  $2 \times 10^{54}$  Pa were produced, with interaural differences in time (for the low-frequency components) or in intensity (for the high-frequency components). Tests included determination of the frequency response region, the threshold of low-frequency response while varying time, the threshold of high-frequency response while varying intensity, a control threshold of high-frequency response varying intensity in both ears, and a threshold for a complex signal varying both the time of the low-frequency component and the intensity of the high-frequency component. There were 26 individual neurons tested at frequencies in the range 0.7-12 kHz (69% below 2 kHz). For single-tone signals,

the neuron reaction as a function of time or intensity essentially depended on both frequency and intensity of the signal. For complex sounds, this relation became cruder or sharply changed form, apparently due to the masking of one component by the other. The observed changes were also distinctive for the initial set of impulses in the neuron discharge compared to the subsequent tonic impulse pattern. The results indicated that the lateralization of sound with changes in time and intensity, and the localization of sound under natural conditions, is based on the common activity of a specific population of neurons, with the lateralization function inherent in specific neurons. This can be experimentally verified by simultaneous registration of the activity of a neuron group reacting to the introduction of interaural differences in sound stimuli with different parameters. Figures 2; references 6: 1 Russian, 5 Western.

12672/13046  
CSO: 1840/1041

UDC 612.18+612.273

#### RESISTANCE, EXCHANGE, AND CAPACITANCE FUNCTIONS OF SKELETAL MUSCLE VESSELS IN ACUTE HYPOXIC HYPOXIA

Leningrad FIZIOLOGICHESKIY ZHURNAL SSSR in Russian Vol 81, No 10, Oct 85  
(manuscript received 15 Jan 85) pp 1229-1237

[Article by B.I. Tkachenko and Yu.I. Ibragimov, Laboratory of Physiology and Pathophysiology of Blood Exchange, Section of Physiology of Visceral Systems imeni Academician K.M. Bykov (head: Tkachenko), Institute of Experimental Medicine, USSR Academy of Medical Sciences, Leningrad]

[Abstract] Fifty cats were drugged and their gastrocnemius isolated hemodynamically, with arterial blood pumped at a constant rate into the muscle. Venous blood was removed by a catheter into an external reservoir and then pumped back into the femoral vein. Average capillary hydrostatic pressure with consequent calculation of pre- and postcapillary resistance was measured volumetrically, as was the coefficient of capillary filtration. Resistance, capacitance, and exchange functions were measured on 20 test animals at 15, 30, and 45 min of acute hypoxia (10% O<sub>2</sub> in nitrogen). The precapillary resistance increased and remained at elevated levels throughout the period of hypoxia. At 45 min, all test animals showed elevated levels, with an average increase of  $26.7 \pm 2.6\%$ . At the same time, postcapillary resistance dropped an average of  $71.6 \pm 12.8\%$ , although 30% of the samples showed increases averaging  $31.1 \pm 3.6\%$ . Capillary hydrostatic pressure similarly dropped an average of  $20.3 \pm 3.2\%$ , although 40% of the animals showed increases averaging  $8.2 \pm 1.1\%$ . The coefficient of capillary filtration shifted by 30% on the average, with 7 samples decreasing, 5 increasing, and 8 shifting first in one direction and then the other. To analyze the neurogenic component of these vascular responses, cross-circulation experiments were performed on the remaining 30 test animals. With perfused arterial blood from donors, responses were similar to those in the first group,

although the increase in precapillary resistance was markedly higher ( $59.0 \pm 10.2\%$ ) and the coefficient of capillary filtration decreased in all cases (averaging  $27.3 \pm 5.2\%$ ). When perfusions were with hypoxic donor blood, the precapillary resistance decreased (averaging  $12.8 \pm 2.7\%$ ), while the postcapillary increased (averaging  $31.5 \pm 9.7\%$ ). In these cases, the hydrostatic pressure increased an average of  $7.9 \pm 1.8\%$  in 10 of 15 samples, and the coefficient of capillary filtration increased an average of  $31.9 \pm 5.5\%$ . Shifts in the coefficient of capillary filtration indicate that precapillary sphincters are neurogenically controlled in response to levels of metabolites in the muscle tissue. Venal outflow decreased in test animals with decentralized vessels of skeletal muscle, while it increased in test animals perfused with arterial donor blood. Figures 5; references 20: 1 Hungarian, 7 Russian, 12 Western.

12672/13046

CSO: 1840/1042

# PUBLIC HEALTH

## MEDICAL SERVICE DATA REPORTED

Moscow VESTNIK STATISTIKI in Russian No 11, Nov 85 pp 75-76

[Text] Number of Physicians and Middle-Level Medical Personnel at the End of 1984\*

	Number of physicians in all areas of specialization total, for every thousands 10,000 people		Number of middle-level medical personnel total, for every thousands 10,000 people	
USSR	1136.4	41.2	3096.4	112.2
by city:				
Alma-Ata	9.7	91.9	16.8	158.6
Ashkhabad	3.2	91.0	4.3	121.7
Baku	13.0	77.6	22.8	136.0
Vilnius	4.0	74.3	8.5	156.7
Gorkiy	8.6	61.7	17.7	126.5
Dnepropetrovsk	6.8	59.2	11.8	102.6
Donetsk	7.0	65.9	14.4	134.9
Dushanbe	4.5	80.7	8.1	144.4
Yerevan	8.1	70.9	13.9	121.4
Kazan	6.9	65.9	12.3	118.2
Kiev	20.2	82.9	34.7	142.5
Kishinev	5.9	94.3	10.4	166.5
Kuybyshev	8.0	64.2	17.1	136.2
Leningrad	41.4	85.3	71.5	147.5
Minsk	10.1	67.6	19.8	133.1
Moscow	88.3	103.2	147.3	172.0
Novosibirsk	9.1	65.7	16.7	120.2
Odessa	9.5	85.8	17.8	160.8
Omsk	7.6	68.3	16.3	147.1
Perm	6.7	63.5	12.0	114.1
Riga	6.9	79.3	14.0	160.2
Sverdlovsk	8.9	68.2	17.3	132.9
Tallinn	3.3	69.5	6.8	141.8

\*Here and in the following table the data for cities include the urban population under the jurisdiction of the city soviet.

Tashkent	15.5	76.9	29.3	145.6
Tbilisi	13.8	120.6	17.7	154.0
Ufa	7.0	66.0	12.5	118.0
Frunze	5.0	84.4	8.8	146.6
Kharkov	10.2	66.3	18.8	121.8
Chelyabinsk	6.8	62.4	13.1	119.9

Number of Medical Institutions and Number of Hospital Beds at the End of 1984

	Number of medical institutions providing out- patient-polyclinic care	Number of hospital institutions	Number of hospital beds Total, thousands	For every 10,000 people
USSR	38,330	23,224	3551.8	128.7
by city:				
Alma-Ata	89	52	18.1	170.8
Ashkhabad	32	19	5.7	160.6
Baku	209	91	21.6	128.8
Vilnius	39	21	10.1	186.6
Gorkiy	110	69	20.7	148.5
Dnepropetrovsk	107	43	16.7	145.3
Donetsk	64	49	17.8	167.3
Dushanbe	66	26	7.7	137.6
Yerevan	116	43	11.5	100.2
Kazan	104	56	16.0	153.8
Kiev	186	93	34.3	140.7
Kishinev	91	29	9.8	156.9
Kuybyshev	96	61	17.2	137.3
Leningrad	484	138	57.5	118.6
Minsk	108	33	18.6	124.9
Moscow	944	236	117.7	137.4
Novosibirsk	117	65	20.4	146.6
Odessa	104	43	14.1	127.5
Omsk	94	55	16.8	151.8
Perm	57	45	15.4	146.3
Riga	69	34	14.3	163.5
Sverdlovsk	82	59	21.3	163.9
Tallinn	44	22	6.7	140.6
Tashkent	233	90	30.5	151.8
Tbilisi	175	59	16.2	141.3
Ufa	74	40	17.4	164.0
Frunze	62	27	10.4	174.9
Kharkov	118	64	22.0	142.6
Chelyabinsk	73	52	16.7	152.6

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CSO: 1840/1072

## ZDRAVOOKHRANENIYE-85, HEALTH FAIR IN MOSCOW

Moscow FOREIGN TRADE in English No 11, Nov 85 pp 32-36

[Article by Nina Matveyeva]

[Text] "Health and Peace for the Present and Future Generations" was the motto of the third international specialized exhibition, Public Health, Medical Equipment and Drugs--Zdravookhraneniye-85, held in Moscow. Its exhibits were displayed at the Sokolniki and Krasnaya Presnya exhibition complexes over an area of 26,000 sq.m. Over 1,000 enterprises, firms and organizations in 24 countries, including the Soviet Union and West Berlin, participated in the exhibition. By the number of participants it was the largest international review of medical science ever held over the last five years.

It is characteristic and natural that it is the USSR that is becoming the venue of this good tradition. The Soviet government and the Communist Party's special concern is the strengthening and development of public health. The USSR Constitution, the state's fundamental law, guarantees basic Soviet socialist public health principles: prophylaxis and free highly skilled medical service accessible to all. More than one million doctors (one third in the world), over three million specialists having secondary medical education guard the Soviet people's health. The Soviet public health service has a wide network of medical establishments: more than 36,000 polyclinics and out-patients' clinics and over 23,000 hospitals. The medical industry is being intensively developed. Over the last seven years Soviet medical equipment deliveries to public health establishments have doubled and those of medicines increased 1.6 times.

The socio-economic program for development of the people's well-being outlined by the 26th CPSU Congress and the subsequent Plenary Meetings of the CPSU Central Committee envisages new tasks to improve the Soviet people's public health service. The qualitative level of Soviet public health is assured on the basis of accelerated scientific and technical progress in the medical industry, outstripping promotion of fundamental researches, wide introduction of modern methods of prophylaxis, diagnostics, and treatment of diseases into practice and the development and greater output of highly effective medicines.

At the exhibition Soviet public health advancements and prospects of development of the Soviet medical industry's material and technical base were widely elucidated in the USSR's section--the largest exposition on show. It was prepared with participation of 44 ministries, over 500 enterprises, research institutes and design bureaus which presented over 4,500 samples of instruments, apparatus, tools, equipment and drugs.

The success of the exhibition from the point of view of its commercial results and the effective exchange of scientific and technical information was mostly due to the technical and qualitative level of presented samples showing the prospects of developing the corresponding sectors.

It must be pointed out that the organizers of the international exhibition Zdravookhraneniye-85 managed to create the optimum conditions for active establishment of contacts between specialists and businessmen, for exchange of experience and study of samples as well as for conducting commercial talks, in other words a good atmosphere for business.

The well-organized information service and comprehensive exhibition program greatly facilitated the success of the exhibition. During the exhibition a scientific and technical symposium was held at which Soviet and foreign specialists delivered almost 70 reports. The exhibition program included Days of firms and enterprises in the USSR, Poland, Hungary, Bulgaria, the GDR, Czechoslovakia, Yugoslavia, Finland, Belgium, Sweden, the Netherlands, Austria, Switzerland, Italy, the FRG, and Great Britain.

Representatives from foreign trade associations such as Medexport, Licensintorg, Mashpriborintorg, Techmashimport, Technointorg, Techsnabexport and Electronorgtechnica exporting and importing goods and licenses used in medicine, participated in the work of the Soviet exposition.

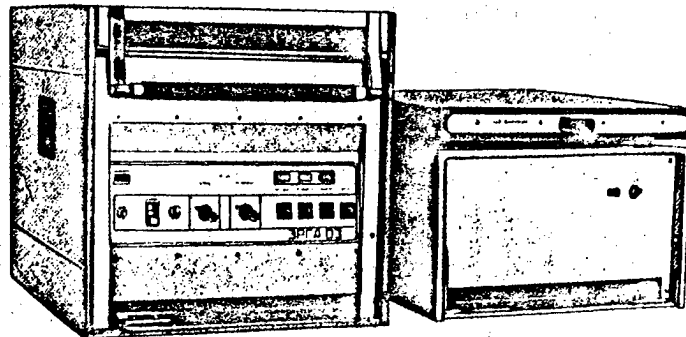
These associations' commercial publicity and advertising activities were based on the Soviet exposition which vividly showed the public health high scientific and technical potential created over recent years.

Along with the Ministry of Medical Industry over 40 industrial ministries and departments take part in designing sophisticated medical facilities and equipment and in manufacturing drugs and medicines.

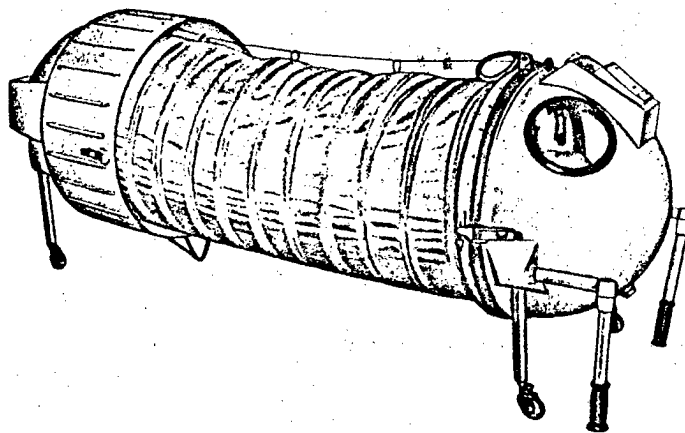
Seventeen stands in the USSR's exposition at the Zdravookhraneniye-85 exhibition demonstrated almost the whole complex of products used in modern scientific and practical medicine among which are: medical equipment and ophthalmological apparatus, various purpose medical instruments and items made from polymeric materials, dental equipment and mobile emergency facilities. Soviet scientists and specialists are undertaking large work in the sphere of developing and preparing medicines, a fact vividly seen from a comprehensive special exposition. It displayed specimens of antibiotics, vitamins, vaccines, various preparations including blood substitutes, medicinal herbs as well as special technological equipment and instruments used for research when developing new preparations and for controlling the manufacture of drugs.



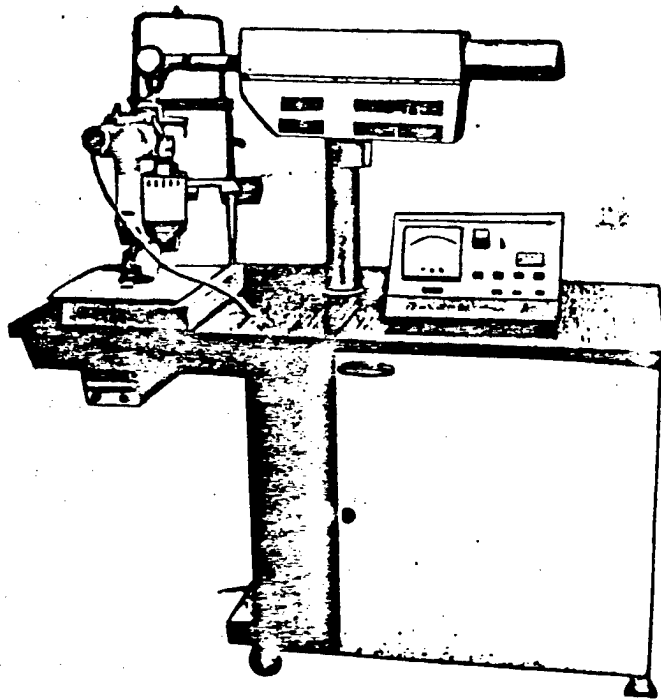
Among the exhibits interesting to specialists at the Soviet exposition were:



The ERGA-03 roentgenographic apparatus used for quick recording of human organisms' inspection results on writing paper.



The Irtysh-MT pressure chamber used for intensive therapeutic treatment under field and transportation conditions.



The Yatagan laser ophthalmological installation.

The exhibition was successful also because of wide participation in it of 500 firms and organizations from various countries.

The socialist countries' enterprises in Bulgaria, Hungary, the GDR, Poland, Yugoslavia and Czechoslovakia demonstrated a wide range of their medical products, wide variety of new diagnostic, laboratory and clinical equipment and drugs. Their exposition included almost all medical technical facilities.

The exhibition showed specific results of the CMEA member-countries' scientific, technical and economic cooperation in equipping public health establishments with technical means and in elaborating medicines. Over the last decade the CMEA member-countries' economic relations concerning the manufacture of drugs have been based on long-term multilateral and bilateral agreements on specialization and mutual deliveries of chemical and pharmaceutical products. The CMEA member-countries' (Bulgaria, Hungary, the GDR, Poland, the USSR and Czechoslovakia) multilateral agreement on scientific and technical cooperation in manufacturing medical equipment includes a number of programs whose realization will promote the solution of many problems concerning the improvement of these countries' public health services and raising their products' competitiveness on the world market.

The resolutions of the CMEA member-countries' Summit Economic Conference (June 1984) which outlined guidelines for the further intensification of

socialist economic integration gave an important impetus to perfecting the fraternal countries' cooperation in the medical sphere. Specific measures aimed at realizing these decisions were included in the two-year plan of the CMEA Standing Commission on Public Health for 1985 and 1986.

Many advanced capitalist and developing countries' industrial and trade firms evinced great interest in the exhibition Zdravookhraneniye-85. Soviet organizations have been fruitfully cooperating with most of them for many years. Their stands displayed a wide range of medical products and equipment. Thus, Austrian firms presented laboratory and drugstore equipment, devices and apparatus for radiological therapy, telemetric systems, diagnostic and dental equipment. Soviet specialists and researchers know very well the microscopes and microtomes supplied by the firm C. Reichert Optische Werke. The firm VÖEST-Alpine is realizing multiaspect cooperation with Soviet organizations: in 1984 a factory manufacturing 6 million spectacle frames per year whose complete equipment had been supplied by this firm was put into operation in the town of Elets. Ten Belgian firms demonstrated medicines, preparations, X-ray equipment and hospital furniture. The Diversified Tech. Belgium firm's products manufactured to a Soviet License are widely used by orthopedists and traumatologists in many countries. Noteworthy is the fact that products manufactured to Soviet licenses or jointly developed with Soviet scientists and specialists were shown at the stands of Great Britain, Italy, the USA, Finland, the FRG, France, etc.

Over 50 firms participating in Great Britain's exposition exhibited sophisticated medical equipment: diagnostic apparatus, computer tomographs and laboratory equipment. Of interest for specialists were medical instruments and equipment for urodynamics demonstrated by Danish firms; dental equipment and materials shown at Italian and Japanese firms' stands; various monitoring systems, laboratory and hospital equipment, dressings, surgical instruments and apparatus--in the sections of the Netherlands, the USA, Switzerland, Sweden and the FRG; computer facilities displayed by Norwegian and French firms.

The exposition of more than 40 Finland's participants was an example of efficient cooperation between two countries' specialists in designing medical equipment and medicines. Soviet and Finnish scientists, engineers and physicians made great progress in joint comprehensive researches into oncology, pediatrics, neurology, neuro-surgery and environmental hygiene. Equipment supplied to the USSR by the firms Finnbrass, Valmet, Nokia, etc., is used in many Soviet clinics and laboratories. Scores of pharmaceutical preparations manufactured at the Finnish pharmacological enterprise Farnos are registered in the USSR.

India's section presented medical goods witnessing the high level of this industry's development ranging from spectacle frames and medicines up to special technological and laboratory equipment supplied to the external market, including the Soviet Union, by Indian industrial enterprises.

Over 1,000 specialists and representatives from foreign firms participated in the work of the exhibition. More than 140,000 scientists, physicians, and specialists from different Soviet towns and regions visited the exhibition.

Soviet foreign trade organizations concluded nearly 100 contracts with foreign exhibitors. New agreements on mutual deliveries of medicines, diagnostic and therapeutic medical equipment and apparatus and other medical products were signed.

The foreign trade association Medexport, participating in the Zdravookhraneniye-85 exhibition was most active in the Soviet section's commercial activity.

At the request of the FOREIGN TRADE magazine M.V. Vasilyev, General Director of Medexport, said a few words about the Association's activity.

The All-Union Association Medexport was set up in January 1961 with the aim of undertaking foreign trade in medical goods.

Simultaneously with the development of the medical industry Medexport, through improving and expanding its activities, has gained stable positions on the world market. The Association is maintaining mutually beneficial ties with almost 400 firms in 90 countries submitting over 9,000 named medical products to the foreign market.

Medexport's major partners are the socialist countries' foreign trade organizations whose portion constitutes 85 percent of the Association's trade turnover.

At the Zdravookhraneniye-85 exhibition the Association's representatives worked in close cooperation with its traditional trade partners: MLW-Intermed and Germed (the GDR); Ciech, Varimex and Labimex (Poland); Pharmachim (Bulgaria); Chemapol and Chirana (Czechoslovakia); Medicor and Medimpex (Hungary); Yugoslavia's enterprises.

Owing to development of the CMEA member-countries' socialist economic integration the proportion of medical products supplied on the basis of specialization and cooperation in production is constantly increasing in the Association's trade turnover. Medexport participates in realizing 17 bilateral and multilateral agreements on medicines and medical equipment concluded between the CMEA member-countries.

The tendency for growth of the Association's trade turnover with the CMEA member-countries will remain in the new five-year plan period (1986-1990) which is confirmed again by successful talks conducted at the Zdravookhraneniye-85 exhibition. The stage of preparation and coordination of agreements for this period will soon be completed.

Trade with many French, Italian, the FRG's, Japanese, British, Swedish, Finnish and other capitalist countries' firms, the majority of which participated in the exhibition, continues to develop.

The Association established good business relations with some developing countries' state organizations and firms.

Medexport's trade turnover is steadily growing and its export list is being expanded and updated.

The USSR's medical industry exports and imports various medical products through the Association's specialized firms, such as: Lekexport exporting ready-to-use medicines; Biopharm exporting and importing biological preparations and medicines; Medpribor exporting and importing medical equipment; Medinstrument exporting and importing medical instruments; Vetpreparat exporting and importing veterinary preparations; Patocrin exporting and importing Tibetan medicines and other medical products; Lekimport importing ready-to-use medicines; Medkomplekt exporting and importing complete equipment and installations for medical establishments and organizations.

The Association's traditional export goods such as medicines: ftorafur, calgam, pantocrin, biogenous stimulators (fibs, aloe and placenta extract), extract of eleutherococcus, etc., are well known and in constant demand on the foreign market.

Recently the Association's export list has had new preparations added to it among which are: psychotropic (pyrazidol, mebikar, phenazepam), cardiovascular (ethmozin, etacizin, ryodipin), antibacterial (dioxydin, chinoxidin), preparations to cure oncological diseases (fotrin, phopurin, spirobromin) and neurotropic preparations (pantoham). The effectiveness and usefulness of medical preparations exported by the Association are confirmed by numerous appraisals received from foreign specialists.

In the near future the export list is to include new Soviet scientists' and specialists' developments such as: ophthalmological preparation--emoxipin, an original diagnostic preparation--ceruloplasmin, a new form of a cardiovascular preparation--trinitrolong, the microbiological industry's products used as fodder additives and veterinary preparations: mastisan, varroatin and fosfosan.

Medexport is well known on the world market as a supplier of highly effective immunobiological preparations (measles and poliomyelitis vaccines and a vaccine against yellow fever). In the last decade veterinary vaccines LTF-130, mentavak, SP-I effectively utilized to prevent animals' dermatomic diseases are being exported in ever increasing volumes.

Medexport, on average, exports annually over 3,500 medical products, all-round tested and mass produced in the USSR. Sets of equipment for cardiovascular surgery, neurosurgery, ophthalmology and stomatology designed with consideration of new methods of prophylaxis, diagnostics and treatment are in ever greater demand in various countries. These sets are completed with precision instruments made of new high-quality materials and titanic alloys.

The majority of the said products were on show at the Soviet stands. Many countries' specialists know very well the Urat-IM medical apparatus for crushing stones in the urinary bladder without surgical interference, Ilizarov's systems for external fixation in traumatology, surgical stitching apparatus supplied by Medexport.

Endoscopic instruments using fiber optics are in greater demand on the foreign market.

The Association exports the Skalpel and Romashka laser medical installations assuring quick operations on pectoral and abdominal cavities with minimum blood losses, the Yatagan installation widely used for eye microsurgery and the LG-75-I physical-therapy installation.

The ERGA-02 electric roentgenographic apparatus given X-ray photographs within two minutes on standard writing paper using any types of X-ray apparatus is also well known.

Of special interest for foreign physicians was a new Lenar apparatus designed for electric tranquilization and combined electric analgesia, which makes it possible to substitute tranquilizing, analgetic and narcotic preparations in various spheres of clinical medicine.

In the near future the Association plans to expand its export list with new models of laser equipment, a number of aerotherapeutic installations, ultrasonic surgical and therapeutic installations and cryogenic apparatus which foreign partners were able to see at the Zdravookhraneniye-85 exhibition.

The Emix and Lix artificial heart valves and the Most-162 membrane oxygenators for cardio-surgery and treatment of sharp breathing deficiency must also be added to this list.

To more comprehensively and vividly inform foreign specialists about Soviet enterprises' products in the public health sphere, Medexport set up medical technical centers and scientific information bureaus in the clients' countries. At present such centers and bureaus are functioning in eight countries.

Registration of new drugs, vaccines, medical equipment in foreign countries, dissemination of Soviet scientists' achievements and maintenance of supplied equipment facilitate Medexport's successful activities on the foreign market.

The Association actively participates in scientific and technical cooperation of Soviet research organizations and industrial enterprises with foreign firms. The joint testing of new active substance obtained in the USSR, preparation of scientific documentation and registration of ready-to-use preparations in the customers' countries need long periods for their accomplishment. The Association annually registers over 20 Soviet medical products in other countries.

Medexport imparts great importance to the commercial and advertising activities at international and specialized exhibitions held in the USSR and abroad. Medexport was an active participant in all previous Public Health exhibitions--in 1974 and 1980 as well as Cardiology-82, Hospital-83, Rheumatology-83 organized in the USSR. In 1984 the Association participated in 12 international exhibitions and fairs arranged in European, Asian and African countries.

The international exhibition Zdravookhraneniye-85 was an important stage in the further consolidation and development of Medexport's mutually beneficial ties with its foreign partners.

In conclusion it must be said that other participants of this large international medical forum share the opinion that the tasks of the exhibition to promote wide international exchange of advancements and "know-how" in the public health sphere, the further progress of medical science, the strengthening of scientific and technical cooperation and expansion of trade and economic ties were accomplished.

/13046

CSO: 1840/ 340-E

## IMPROVED HEALTH SYSTEM AND MORE PRODUCTIVE WORKERS

[Editorial Report] Alma-ata QAZAQSTAN KOMMUNISI in Kazakh No 9, September 85 carries on pages 43-48 a 2,800-word article by KaSSR Minister of Health M. Aliyev entitled "Health--A Great Treasure." The article looks at the present state of republic health care and at new plans now being advanced to improve the health and thus productivity of the workers.

Aliyev suggests that the Gorbachev doctrine in public health will focus upon improved health services across the board, particularly in terms of rural areas, and stress preventive health care to increase the well-being, life expectancy, and capacity for work of the workers. Included as part of this program will be a buildup of special alcoholism treatment facilities (including new alcoholism preventive dispensaries) and an enhanced education program to make clear the damage caused society by alcoholism.

Concerning the republic health care system in general, Aliyev records the substantial gains that have been made in the last decade or so. The number of hospital beds, for example, is up 19 percent since 1980 to a total of 259,000, 16.35 beds per 1,000 inhabitants of the republic. There are now, moreover, 53,000 doctors--3.57 per 1,000--in the republic and 10.6 medical technicians with middle school educations per 1,000. In 1984, Aliyev continues, 2,686 new physicians, 419 medical sciences professors, and 10,400 medical specialists and technicians graduated to add to the ranks of republic health workers and plans call for the number of physicians to be increased to 70,000 by 1990.

11433/13046

CSO: 1840/337-E



## MORE EXTENSIVE RURAL MEDICAL FACILITIES

Moscow VESTNIK STATISTIKI in Russian No 12, Dec 85, p 54

[Excerpt] The level of rural medical care is approaching that of urban areas at a regular rate. The number of physicians of all specialties per 10,000 urban population increased by 35 percent in 1984 compared with 1970, and the number of hospital beds by 7 percent. As for the countryside (taking into account use of urban therapeutic-prophylactic institutions), the respective numbers per 10,000 rural population increased by 68 percent and 34 percent.

Table 13. Ambulatory-Polyclinic Institutions Put Into Operation in Rural Areas  
(thousands of visits per shift)

	<u>Total</u>	<u>Breakdown by Responsible Organization</u>	
		<u>State and Cooperative Enterprises and Organizations</u>	<u>Kolkhozes</u>
Four Years of 11th			
Five-Year Plan	83	55	28
1981	17	13	4
1982	17	13	4
1983	25	16	9
1984	24	13	11

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9582/13046

CSO: 1840/296

#### BRIEFS

HEALTH CARE IN SIBERIA--G. Sergeyev, RSFSR deputy minister of health, informed the editorial staff that the ministry has reviewed the article "Siberian, How Do You Feel?" (PRAVDA, 25 November). Mobile medical teams have been organized to bring medical care closer to the residents of remote villages and to monitor their health, especially that of reindeer herders in nomadic camps. In the 12th Five-Year Plan the RSFSR Ministry of Health will continue to improve the medical services provided to the people of Siberia. There are plans to build and put into operation central rayon and district hospitals with a total of 10,200 beds and polyclinics with a total capacity of 13,500 visits per shift, to organize 305 outpatient centers, and to expand further the network of mobile types of medical care. [Text] [Moscow PRAVDA in Russian 28 Dec 85 p 3] 9967

CSO: 1840/1072

UDC 614.256

#### LEGAL PROTECTION FOR PRINCIPLE OF FREE MEDICAL CARE

Kiev KLINICHESKAYA KHIRURGIYA in Russian No 11, Nov 85 (manuscript received 18 Feb 85) pp 45-47

[Article by V.A. Glushkov, Kiev Higher School, USSR Ministry of Internal Affairs]

[Abstract] A brief discussion is presented of the principle of free medical care in the USSR and fee-for-service practices that can form a serious threat to this principle. Free medical care in the USSR is guaranteed by the Soviet Constitution and the constitutions of the Soviet republics, and, in the Ukraine, transgressions in this respect fall under article 155 of the Ukrainian SSR Criminal Code. Several examples are provided of illegal charges made to patients by medical workers for personal gain. It is to be emphasized that similar criminal activity can be prevented by appropriate training and elimination of habits in medical personnel that lead to greed. Successful reformulation of traits and personalities can be achieved through ideological indoctrination and judicious use of legal recourses available to the authorities.

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CSO: 1840/1065

UDC 340.6:614.2

#### CONTRIBUTIONS OF FORENSIC MEDICINE TO PUBLIC HEALTH PROBLEMS

Moscow SUDEBNO MEDITSINSKAYA EKSPERITIZA in Russian No 2, Apr-Jun 85 (manuscript received 31 Oct 84) pp 21-25

[Article by A.P. Gromov and A.V. Kapustin, Scientific Research Institute of Forensic Medicine, USSR Ministry of Health, Moscow]

[Abstract] An analysis was conducted of the way in which forensic medicine can participate to the fullest extent possible in Soviet public health programs, with the notation made at the outset that more should be expected from the All-Union Scientific Society of Forensic Physicians. The expertise of the forensic physicians can be utilized in many ways, not the least of

which pertains to improving the quality of medical care in the USSR by careful analysis of the causes of death, postmortem confirmation of diagnoses and treatment procedures and decisions, and in confirmation of epidemiologic data. Full potential of forensic medicine can be realized by innovations and more careful utilization of the latest technologies in chemistry and histopathology, and the use of such tools for basic as well as clinical research. However, for full realization of all the potential contributions that forensic medicine can make, there is need for cooperation and coordination with the other medical and public health services, as well as for more intensive postgraduate studies in the various branches of forensic medicine.

12172/13046  
CSO: 1840/1051

UDC 616-084.3:614.253.2

#### ROLE OF INTERMEDIATE MEDICAL WORKERS IN IMPLEMENTATION OF TOTAL NATIONAL MEDICAL CHECKUPS

Moscow MEDITSINSKAYA SESTRA in Russian No 6, Jun 85 pp 48-49

[Article by V.M. Istyagin, Chief Physician, Gribovskiy Central Rayon Hospital, Voronezh Oblast]

[Abstract] In September 1983, the author's hospital began intensive work to implement the decision for medical checkups for the entire population (dispensarization). The rayon executive committee approved two plans worked out by medical personnel and supervisors of industrial plants, collective and state farms, and other institutions. These were a schedule for the checkups and a medical institution plan of improvement measures. Procedures for mass checkups were developed, including a card routing system and daily visits to villages. This greatly increased the work load for many medical personnel. Special training for nurses included conducting electrocardiograms, while medical and sanitary activists carried out a census of the local inhabitants. Section nurses set up appropriate documentation for the checkup unit; together with those nurses working with specialist physicians, they processed outpatient cards and made required entries. The section nurses also verified census data and scheduled appointments. Nurses of inpatient wards had to prepare much of the follow-up documentation for those with medical problems, including completion of their medical histories and inclusion of a specific diagnosis and its designated treatment. Pediatric checkups were carried out by a five-group system. Nurses also carried out health improvement measures, including guidance on healthy life styles. Overall, a program of medical checkups for the whole population can be successfully carried out by mobilization of medical resources and proper distribution of functional responsibilities of nurses.

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CSO: 1840/1052

## DESTRUCTIVE CONSEQUENCES OF ALCOHOL

Kishinev SELSKOYE KHOZYAYSTVO in Russian No 12, Dec 85 pp 55-56

[Article by I. Gutsul, Moldavian SSR Deputy Minister of Health and A. Naku, doctor of medical sciences, professor, Chief Psychiatrist of MSSR Ministry of Health]

[Abstract] Effect of alcohol abuse is reviewed pointing out that there is no "safe," "social" drinking. Even minimal consumption (1 shot of hard liquor, 1 glass of wine, or 1 bottle of beer) leads to destruction of neurons in the brain--an irreversible process. The misconception prevalent among the population concerning "medicinal" effect of wine products is challenged. Any alcohol leads to impairment of physical and mental processes. It was pointed out that a special problem exists in households where the woman is an alcoholic. Finally, the role of the Communist Party played in attempts to curb alcoholism is praised.

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CSO: 1840/1070

UDC 615.473.3:615.478.35

## UNIVERSAL VALISE FOR TRANSPORTING SYRINGES

Moscow MEDITSINSKAYA SESTRA in Russian Vol 28, No 10, Oct 85 pp 36-40

[Article by V.A. Kardashev, Gomel State Hospital of Emergency Medical Aid]

[Abstract] This compact plywood valise (483 x 366 x 121 mm) was designed for carrying 110 syringes, based on the average daily usage of a ward with 45-60 beds. It is divided into a utility section with a removable cover and two sections with removable syringe holders. The larger section contains two similar syringe holders (175 x 290 mm) while the last section contains a single smaller one (152 x 177 mm). The holders are equipped with clear plexiglass inserts which have circular cutouts sized for the upper and lower portions of syringes. The smaller syringe holder has just one upper and one lower insert; the larger ones have one upper insert and three separate lower inserts positioned at different heights to properly hold various size syringes. Loop handles placed vertically on the sides of the holders allow them to be easily removed from the case. In the sterilizing unit, syringes in packets are put into the case and brought to the ward. As the syringes are used, they are placed into the proper positions in the syringe holders, and the needles are collected in one of the empty packets. Empty packets can be placed in the valise cover behind elastic straps or packed on top of the used syringes for return to the sterilizing unit. Overall, the use of the valise reduces breakage and simplifies handling of the syringes.

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PHYSICAL THERAPY AND HEALTH RESORT MEDICINE IN MASS MEDICAL SCREENING  
(DISPENSARIZATION)

Moscow VOPROSY KURORTOLOGII, FIZIOTERAPII I LECHEBNOY FIZICHESKOY KULTURY  
in Russian No 6, Jun 85 pp 1-5

[Article by O.I. Yefanov, Moscow Medical Stomatological Institute imeni  
N.A. Semashko]

[Abstract] With the advent of mass medical screening (dispensarization) in the USSR, particular attention has to be accorded to the physical therapy and health resort medical components of Soviet health care. Greater emphasis and demand will be placed on both components to accommodate more patients and convalescents, in addition to the role of these services and facilities in preventive medicine. This will require a more rational allocation of funding and resources and the development of new facilities and expansion of existing institutions. It has already been determined that mass medical screening will increase the actual patient load by 20-30%, making it all the more important to develop the health resorts in a timely fashion to handle that particular category of people. Determination has also been made that every city with a population of at least 500 thousand must have a fully functional rehabilitation center. Additional emphasis is also being placed on improving and developing rural physical medicine facilities to serve the agricultural sector.

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CSO: 1840/1057

METHODOLOGICAL ASPECTS OF MASS SCREENING OF HEALTH (DISPENSARIZATION)

Moscow VESTNIK AKADEMII MEDITSINSKIKH NAUK SSSR in Russian No 5, May 85  
(manuscript received 30 Nov 84) pp 3-14

[Article by O.P. Shchepin, G.I. Tsaregorodtsev and V.G. Yerokhin, Moscow]

[Abstract] The Soviet concept of mass medical screening [dispanserizatsiya] is understood to mean constant and dynamic monitoring of health status indicators, early detection of illness, evaluation and elimination of risk factors, and holistic management of medical and social resources to improve health, working conditions, and the environment. Mass screening is conducted across broad lines encompassing occupational, age and sex categories, as well as in terms of disease profiles. The latter aspect is subserved by more than three thousand cardiological, antituberculosis, skin and venerological, oncological, psychoneurological, antigoiter, and physical medicine dispensaries. The first stage (1985-1987) of the Soviet mass screening program involves

fine-tuning the administrative and medical resources to encompass the entire Soviet population in a timely and efficient manner. The second stage (to 1990) anticipates further expansion of the efforts and greater reliance on laboratory and function tests, enlistment of a greater number of specialists in the periodic examinations, and elimination of the disparity between urban and suburban medical screening. References 19 (Russian).

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CSO: 1840/1064

UDC 616.1/.8-084.3

#### MEDICAL CHECKUPS: ONE WAY TO STRENGTHEN NATIONAL HEALTH

Moscow MEDITSINSKAYA SESTRA in Russian No 6, Jun 85 pp 6-9

[Article by A.M. Moskvichev, Moscow]

[Abstract] An important contemporary task is a staged implementation of yearly medical checkups for the entire population as a means of strengthening popular health; lowering sickness, including temporary work disabilities; and increasing average life span. These checkups will include laboratory and instrument tests, follow-up checks for those needing them, appropriate treatment, and follow-up supervision. Actually, a significant part of the population already has regular checkups; this program will extend it to everyone. Outpatient polyclinics will play a leading role in this. During the preparatory period, all outpatient clinics will carry out a medical registration and information program using mass media, Red Cross and Red Crescent, trade unions, and other social organizations. Priority groups will be identified, including children and teenagers; workers in industry, building, transport, and communication; machine operators, milkmaids, livestock breeders, farmers, and other agricultural workers; and war invalids and veterans. Special attention will be given to cardiovascular disease, cancer, chronic lung problems, and some endocrine and other illnesses, as well as hearing and eye problems. Checkups will include blood pressure; eye and hearing checks; blood and urinalysis; chest x-rays; EKG's for persons over 30; and pap smears for women. Appropriate further tests or medical treatment will be taken. Checkups will be integrated with other medical procedures or clinical exams, scheduled with supervisors of workers' collectives, organized at places of work, or even conducted by house calls when necessary. Local medical personnel will have a major role in the program, collecting personal data, performing routine checks, and supervising follow-up medical treatment resulting from the checkup. Microcomputers and automated procedures will be widely used, requiring an increased level of training for medical workers and expansions of laboratory facilities. The program as a whole will require a wide range of new organizational arrangements implementing the continued growth in the preventive direction of Soviet medicine.

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## SECOND STAGE OF MASS PHYSICAL EXAMINATIONS AHEAD

Minsk SELSKAYA GAZETA in Russian 7 Jan 86 p 2

[Article by I. Balashko, Chief Physician in Myadelsk Rayon, candidate of medical sciences]

[Abstract] Advantages of preventive medical programs have been addressed. Only too often patients appear at physicians' offices much too late for simple treatment of a simple disease. After a long time of self-medication, they finally turn up in hospitals with advanced stages of a disease. The answer to this problem is mass screenings [dispensarization] and even annual physical checkups. Such a program has been initiated in Myadelsk Rayon and in a few years has given obvious positive results: more office visits, fewer days of disease-related absenteeism. About 85% of the population has been captured in this program. The second stage is to initiate prophylactic treatment and early diagnosis which could lead to early control of the diseases. Health protection extends beyond control of disease--health protection means achievement of physical, emotional, and social satisfaction.

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CSO: 1840/1071

## HEALTH SCREENING APPROACH

Alma-Ata KAZAKHSTANSKAYA PRAVDA in Russian 12 Jan 86 p 3

[Article by A. Buyvidovich, Deputy Chief of Kustanay Oblast Health Department]

[Abstract] It is easier to prevent a disease than to treat it. It is easier to treat an early diagnosed problem than a late one and therefore plans are under way to implement annual checkups of the entire population in the USSR during the last decades of the 20th century. In Kustanay Oblast, much of the population has already been captured in the annual screening program. The network of examination centers and the organizational aspects are reported. One of the painful deficiencies is the lack of adequate funding. Another is inadequate number of specialists (two surgeons per 30-40,000 population) and of the technical support and administrative cadres. Finally, there is a painful need for specialized laboratory and clinical equipment. Hope is expressed for improvements during the next five-year plan period, but to achieve this, in addition to medical personnel help must also be forthcoming from the administrative cadres.

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SYSTEMS ANALYSIS OF MENTAL DEADAPTATION AS SCIENTIFIC AND METHODOLOGICAL  
APPROACH TO STUDIES ON BORDERLINE NEUROPSYCHIATRIC DISORDERS

Moscow VESTNIK AKADEMII MEDITSINSKIKH NAUK SSSR in Russian No 5, May 85  
(manuscript received 30 Nov 84) pp 61-69

[Article by Yu.A. Aleksandrovskiy, Moscow]

[Abstract] A brief theoretical foundation is advanced for the use of a systems approach to analysis of borderline neuropsychiatric disorders, proceeding from the assumption that normal mentation represents the culmination of mental adaptation predicated on an integrated polyfunctional substrate. The interrelationship of the individual components or subsystems underlying mental adaptation results in integrated qualities that are not evident in the individual subsystems. Mental adaptation represents the plasticity of the central nervous system which allows for normal mental function in terms of optimal analyses of natural and social stimuli and active and goal-oriented responses. The degree to which functional integration is perturbed, either as a result of congenital or later-onset brain injury, determines the neurotic or more serious psychiatric consequences that may follow as a result of mental deadadaptation. Borderline neuroses follow when the plasticity cannot fully compensate for a given subsystem's failure either to fully perceive or to process incoming information in an adequate and appropriate manner. Clinical psychopathology, then, represents mental deadadaptation resulting from failure of functional integration of a variety of subsystems, and as such should lend itself to systems analysis.

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## CONFERENCES

UDC 577.21

### INTERNATIONAL SEMINAR 'RECOMBINANT DNA. MOLECULAR AND CELLULAR ASPECTS'

Moscow VESTNIK AKADEMII NAUK SSSR in Russian No 12, Dec 85 pp 60-67

[Article by A.A. Bayev, academician]

[Abstract] The title seminar was held in June 1985 in Pushchino, organized by the Institute of Bioorganic Chemistry imeni M.M. Shemyakin, USSR Academy of Sciences and Institute of Biochemistry and Physiology of Microorganisms, USSR Academy of Sciences, where the actual sessions were held. Vice president of the USSR Academy of Sciences, Academician Yu.A. Ovchinnikov opened the seminar stressing great potential offered by advances in genetic and cellular engineering. Zh. Zhaz extended greetings from UNESCO. The following topics were covered: new achievements in recombinant DNA research; genome organization; recombinant molecules used to solve problems of molecular basis of oncogenesis; biotechnology of peptide hormones and enzymes; biotechnology of immunostimulators, monoclonal antibodies, vaccines, growth factors; genetic and cellular engineering of plants; future potential of genetic engineering, biotechnology and bioengineering of proteins; diagnosis of hereditary diseases and gene therapy. Under the general topic of genetic engineering, the question of vectors was stressed: cosmids, phagemids, T4-phage studies, interferon, and organization of genome of eukaryotic source. In discussion of cancer problems, oncogenes and retroviruses were covered. The attendees site-visited the four Institutes: Institute of Biochemistry and Physiology of Microorganisms, Institute of Bioorganic Chemistry, Institute of Molecular Biology, and Institute of Molecular Genetics.

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